


WASTE MANAGEMENT PLAN

To facilitate waste management and reduction, Council requires on-site sorting and storage of waste products pending re-use, recycling or collection.

The applicable sections of the following waste management plan must (at a minimum) be completed and submitted with applications which involve the demolition, design and construction, the use of a building and on-going management.

Larger developments should include the level of detail which reflects the scale of the development. The Resource NSW website contains a number of best practice publications that may be of assistance for more detailed waste management planning activities.

The information provided in the waste management plan will enable an assessment of how it is intended to re-use, recycle and dispose of waste. The information will be assessed against prescribed targets for the minimisation of waste disposal.

Outline of Proposal	
Site Address: 49A & 51 NORFOLK ROAD, EPPING	
Applicant's name and address: EDWARD JO	
C/- MINDA PLANNING SERVICES	
P.O. BOX 424 BEROWRA	
Phone: 9875 4788	Fax:
Buildings and other structures currently on the site: SINGLE STOREY	
DWELLING & CARPORT	
Brief Description of Proposal:	
SUBDIVISION OF TWO LOTS INTO 4 LOTS	
The details provided on this form are the intentions for managing waste relating to this project	
Signature of Applicant: 	Date: 8/11/21

SECTION ONE – DEMOLITION STAGE

To be completed for applications involving demolition, excavation or residential subdivision (where involving 6 or more lots).

DESTINATION AND QUANTITY OF WASTE REUSE AND RECYCLING										DISPOSAL
MATERIALS ON SITE	TYPE OF MATERIAL	ESTIMATED VOLUME (M³) *see A2.01 to help determine volume	ESTIMATED WEIGHT (kg) *see A2.01 to help determine weight	ON-SITE		OFF-SITE			* see A1.03 for transfer stations and landfills Quantity (kg) Probable destination	
				Quantity (kg)	Use * see A1.02 for suggestions	Quantity (kg)	Probable destination * see appendix A1.04 for outlets			
Excavation Material		80m³			use as mulch on site		N/A		Wendy	
Green Waste		40m³			use on site		N/A			
Bricks		40m³					concrete rebar 14 Thackeray			
Concrete		30m³					at Connellua			
Tiles		25m³								

(Section One – Demolition Stage – continued)

MATERIALS ON SITE		DESTINATION AND QUANTITY OF WASTE REUSE AND RECYCLING				DISPOSAL	
TYPE OF MATERIAL	ESTIMATED VOLUME (M ³) *see A2.01 to help determine volume	ESTIMATED WEIGHT (kg) *see A2.01 to help determine weight	ON-SITE		OFF-SITE		* see A1.03 for transfer stations and landfills Probable destination
			Quantity (kg)	* see A1.02 for suggestions Use	Quantity (kg)	* see A1.02 for suggestions * see A1.04 for outlets Probable destination	
Timber - Please Specify	25m ³			Stored separately in geotextile water recycled.		Khari ki Chhassay - Kumbh Caste	Bandaru
Plasterboard	10m ³						
Metals Please Specify	5m ³						
Other - Please Specify							
TOTAL WASTE			kg (100%)		kg () %		kg () %

Does the combined re-use and recycling of waste materials meet Council's target of 60% or greater (Yes/No) _____.
If no, revisit the table to see where improvements may be achieved. If the target is still not possible, please state reasons why:

SECTION TWO – DESIGN STAGE

To be completed for all applications involving the design of buildings.

Choice of Building Materials

	Building Materials	Reused or Recycled	Ecological Sustainability of Building Materials (See A3.01)
Used		Used (✓)	Considered (✓)
	External Wall Type:		
<input type="checkbox"/>	Brick	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	Timber/Weatherboard	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	Autoclaved Aerated Concrete	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	Concrete	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	Stone	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	Fibrous Cement	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	Hardiplank	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	Steel	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	Aluminium	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	Other (Specify).....	<input type="checkbox"/>	<input type="checkbox"/>
	Frame:		
<input type="checkbox"/>	Timber	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	Steel	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	Other (Specify).....	<input type="checkbox"/>	<input type="checkbox"/>
	Internal Wall Type:		
<input type="checkbox"/>	Brick	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	Timber	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	Autoclaved Aerated Concrete	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	Concrete	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	Stone	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	Plasterboard	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	Insulation (Specify).....	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	Other (Specify).....	<input type="checkbox"/>	<input type="checkbox"/>
	Ground Floor Type:		
<input type="checkbox"/>	Concrete Slab on Ground	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	Suspended Concrete Slab	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	Suspended Timber	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	Insulation (Specify).....	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	Other (Specify).....	<input type="checkbox"/>	<input type="checkbox"/>
	Floor Covering:		
<input type="checkbox"/>	Tiles	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	Slate	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	Carpet	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	Timber	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	Vinyl	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	Other (Specify).....	<input type="checkbox"/>	<input type="checkbox"/>
	Roof Covering:		
<input type="checkbox"/>	Concrete Roof Tiles	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	Terracotta Roof Tiles (Clay)	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	Slate	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	Metal deck	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	Aluminium	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	Fibreglass/Plastics	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	Insulation (Specify).....	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	Other (Specify).....	<input type="checkbox"/>	<input type="checkbox"/>
	Notable Site Works:		
<input type="checkbox"/>	Asphalt Driveways/Paving	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	Concrete Driveways/Paving	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	Brick Fences/Walls	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	Timber Fences/Walls	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	Concrete Fences/Walls	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	Stone Fences/Walls	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	Other (Specify).....	<input type="checkbox"/>	<input type="checkbox"/>

Note: Tick boxes to indicate what building material is used, whether it is reused or recycled and whether its ecological sustainability qualities have been considered.

(Section Two – Design Stage - continued)

Building Design

Design Techniques	Used
The appropriate location of waste management facilities	()
Design energy efficient housing to minimise energy consumption and use of fossil fuels (see Energy Efficient Housing Policy)	()
Design to standard material sizes, use modular construction, prefabricated material and basic designs to reduce the need for off-cuts	()
Specify the use of second hand, recycled or resource efficient building materials	()
"Design for deconstruction" techniques should be used so materials can be easily reused/recycled at the end of the life span of the building	()
Retrofit and repair existing buildings	()
Design to minimise excavation	()
Re-use off-cuts in building design	()
Design and specify for the smallest possible satisfactory solution	()
Retain a copy of the building plans and specifications with the building to aid maintenance and resource recovery at the end of a buildings lifespan	()
Landscape design incorporates an area for composting	()
Other (Specify)	()

Note: Tick boxes where design techniques have been or will be utilised to minimise waste.

SECTION THREE – CONSTRUCTION STAGE

To be completed for all applications involving construction of buildings.

MATERIALS ON SITE	DESTINATION AND QUANTITY OF WASTE REUSE AND RECYCLING						DISPOSAL	
	EXPECTED WASTE MATERIALS	ESTIMATED VOLUME (M³) *see A4.01 to help determine volume	ESTIMATED WEIGHT (kg) *see A4.01 to help determine weight	ON-SITE		OFF-SITE		
				Quantity (kg)	Use * see A1.02 for suggestions	Quantity (kg)		Probable destination * see A1.02 for suggestions * see A1.04 for outlets
Excavation Material								Quantity (kg) * see A1.03 for transfer stations and landfills Probable destination
Green Waste								
Bricks								
Concrete								
Tiles								

(Section Three – Construction Stage – continued)

DESTINATION AND QUANTITY OF WASTE REUSE AND RECYCLING										DISPOSAL	
MATERIALS ON SITE	EXPECTED WASTE MATERIALS	ESTIMATED VOLUME (M³) *see A4.01 to help determine volume	ESTIMATED WEIGHT (kg) *see A4.01 to help determine weight	ON-SITE		OFF-SITE		* see A1.03 for transfer station and landfills Quantity (kg) Probable destination			
				Quantity (kg)	Use	Quantity (kg)	* see A1.02 for suggestions * see A1.04 for outlets Probable destination				
Timber - Please Specify											
Plasterboard											
Metals – Please Specify											
Other – Please Specify											
TOTAL WASTE			kg (100%)		kg (%)		kg (%)		kg (%)	kg (%)	

Does the combined re-use and recycling waste meet Council's target of 60% or greater (Yes/No) _____.
If no, revisit the table to see where improvements may be achieved. If the target is still not possible, please state reasons why:

SECTION FOUR – USE AND ON-GOING MANAGEMENT

To be completed for all applications involving the construction of residential accommodation and commercial and industrial developments or for the change of use of same.

Describe how you intend to ensure on-going management of waste on-site. Issues which may require to be addressed include maintenance, signage and responsibilities.

ISSUE		PROPOSED ARRANGEMENTS
Size and Location	Use of premises.	
	Number of dwellings/units.	
	Estimated garbage generation (See A6.01).	
	Estimated recycling generation (See A6.01).	
	Number of and capacity of waste storage bins and volume handling and reduction equipment to be used for managing garbage.	
	Number of and capacity of waste storage bins and volume handling and reduction equipment to be used for managing recyclables.	
	Number of and capacity of waste storage bins and volume handling and reduction equipment to be used for managing garden organics (if applicable).	
	Area/s allocated for waste storage and recycling area and volume handling and reduction equipment (highlight on plan drawings).	
On-site Access		
	Describe arrangements for on-site access by residents to waste facilities (highlight on plan drawings)	
	Describe arrangements for on-site access by collection contractors to waste facilities (highlight on plan drawings)	
Design and Construction		
	Describe the fire safety features and protection equipment provided.	
	Describe how noise associated with residents using the bins, collection contractors emptying the bins and waste falling through and out of the bottom of a garbage chute has been minimised.	
	Describe any features for preventing ingress of vermin into waste storage areas.	
	Describe measures taken to ensure waste storage areas are aesthetically consistent with the rest of the development.	
	Describe the light source and method of ventilation within waste storage areas.	
	Describe facilities for washing bins, waste storage areas and garbage chute systems.	
	Describe the features incorporated in the design of the volume handling and reduction equipment to ensure its safe and efficient operation.	
On-going Waste Management		
	Identify the time frame that it will take to introduce an environmental management system (i.e. waste minimisation and management strategy).	
	Describe arrangements for the cleaning and maintenance of waste storage areas and volume handling and reduction equipment.	
	Describe arrangements for ensuring appropriate signage and ensuring residents/tenants are aware of how to use the waste management system correctly.	
	Identify each stage of waste transfer between residents'/tenants' units and loading into the collection vehicle. Who is responsible for each transfer?	
	Describe arrangements for the disposal of hazardous waste (if applicable)(See A6.02).	



EARTHSCAPE HORTICULTURAL SERVICES
Arboricultural, Horticultural and Landscape Consultants

ABN 36 082 126 027

ARBORICULTURAL IMPACT ASSESSMENT REPORT

PROPOSED SUBDIVISION

49A & 51 NORFOLK ROAD, EPPING

November 2021

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Member International Society of Arboriculture - Australian Chapter (ISAAC)
Member Local Government Tree Resources Association (LGTRA)*



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1 INTRODUCTION

- 1.1.1 This report was commissioned by Minto Planning Services on behalf of Mr Eduard Jo to assess the health and condition of thirty-nine (39) trees located within or immediately adjacent to 49A and 51 Norfolk Road, Epping. The report has been prepared to aid in the assessment of a Development Application (DA) for the subdivision of the property to create four (4) new lots.
- 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 Parramatta City Council's guidelines for preparation of Arborists Reports as outlined in Section 2.3 & 5.4 of the *Parramatta Development Control Plan 2011* (PDCP) and Sections 2.3.2 - 2.3.5 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 two (2) co-joining residential allotments known as Lot 2 in DP 215388, being 49A Norfolk Road, Epping and Lot 14 in DP 1104495, being 51 Norfolk Road, Epping. For the purposes of this report, the subject allotments will be referred to as 'the site'. The total area of the site is 2472.3 m². The site is zoned Low Density Residential [R2] under the *Hornsby Local Environmental Plan 2013* (HLEP), being located within the former Hornsby Local Government Area (LGA).
- 2.1.2 49A Norfolk Road is a battle-axe allotment containing an existing single storey dwelling located centrally within the lot, together with a detached carport adjacent to the eastern boundary. 51 Norfolk Road contains a single storey dwelling located in the eastern portion of the lot with a semi-detached garage adjacent to the southern boundary and an inground swimming pool in the rear yard. The site has a moderate north-westerly gradient. Both lots contain established lawns and gardens typical of surrounding residential properties, with a number of mature and semi-mature trees. These include a variety of non-local native and exotic (introduced) species.
- 2.1.3 The soils of this area are typical of the Glenorie Soil Landscape Group (as classified in the *Soil Landscapes of the Sydney 1:100,000 Sheet*), consisting of "shallow to moderately deep (less than 1000mm) *Red Podzolic Soils* on crests, moderately deep (700 – 1500 mm) *Red & Brown Podzolic Soils* on upper slopes and deep (greater than 2000mm) *Yellow Podzolic Soils* on lower slopes". Soil materials are derived from Wianamatta shales. The landscape of the area generally consists of undulating to rolling low hills with slopes of 5-20%.¹
- 2.1.4 The original vegetation of this area consisted of tall open forest (Blue Gum High Forest) which was progressively logged for timber-getting from early in the nineteenth century then cleared for agricultural use (mainly orchards and market gardens) and later for residential development.² The dominant locally-indigenous tree species found in this area include *Eucalyptus saligna* (Sydney Blue Gum) and *Eucalyptus pilularis* (Blackbutt). Other species occurring in this vegetation community may include *Syncarpia glomulifera* (Turpentine), *Eucalyptus paniculata* (Grey Ironbark), *Angophora floribunda* (Rough Barked Apple), *Eucalyptus acmenoides* (White Mahogany), *Angophora costata* (Sydney Red Gum), *Eucalyptus resinifera* (Red Mahogany) and *Allocasuarina torulosa* (Forest Oak). There are no locally-indigenous tree species remaining within the site.

3 SUBJECT TREES

- 3.1.1 The subject trees were inspected by Earthscape Horticultural Services (EHS) on the 16th September 2021. 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 Surveyplus, Dwg. Ref No. 20489_DET_1A [A] dated 03/09/2021. The numbers used on this plan correlate with the Tree Assessment Schedule (**Appendix 3**).

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 laser distance measurer in four directions and an average taken);
 - **Trunk diameter** (measured with a diameter tape 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);
 - **Maturity Class** - the Maturity Class for each tree has been divided into the following categories:-
 - **OM** Over-mature – greater than 80% of the life expectancy for the species;
 - **M** Mature – 50-80% of the life expectancy for the species;
 - **SM** Semi-mature – 20-50% of the life expectancy for the species;
 - **I** Immature – less than 20% of the life expectancy for the species.
 - **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); and
 - **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 Expectancy⁴ 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)
- 4.2.1 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 this area of the City of Parramatta Local Government Area (LGA) (former Hornsby LGA) are protected the provisions of Part 1, Section B.7 of the *Hornsby Development Control Plan 2013* (HDCP) [revised March 2018] made pursuant to Clause 9 of the *State Environmental Planning Policy (Vegetation in Non-rural Areas) 2017* (Vegetation SEPP). The HDCP generally protects all tree and palm species with a height of five (5) metres or greater, any tree or mangrove vegetation located on public land (irrespective of size), all trees growing within a Heritage Conservation Area and all trees growing within land listed as a Heritage Item under the HLEP (irrespective of size). Some exemptions apply. However, all of the trees are protected under the provisions of the HDCP, being located within a Heritage Conservation Area (refer **Section 5.3.2**).

5.2.2 *Wildlife Habitat*

All of the trees are exotic (introduced) or non-local native species that would be of some benefit to native wildlife. However, none of the trees contain cavities that would be suitable as nesting hollows for arboreal mammals or birds. Several trees exhibited evidence of foraging by Brushtail or Ringtail Possums, including T8 (Solange Magnolia), T14 (Yulan Magnolia) and T19 (English Oak). There were no other visible signs of wildlife habitation.

5.2.3 Noxious Plants & Environmental Weeds

Cinnamomum camphora (Camphor Laurel) [T2, T3 & T4] is scheduled as a potential 'Biosecurity Risk' ('Priority Weed' – formerly 'Noxious Weed') within all of 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. These trees are protected under Council's Tree Management Controls, being located within a Heritage Conservation Area.

Acer negundo (Box Elder) [T7, T9 & T10] and *Syagrus romanzoffianum* (Cocos Palm) [T6] are both considered to be Environmental Weed Species within the Hornsby and Parramatta Local Government Areas (LGAs). However, all of these trees are protected under Council's Tree Management Controls, being located within a Heritage Conservation Area.

5.2.4 Threatened Species & Ecological Communities

None of the subject 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 *Environment Protection and Biodiversity Conservation Act 1999*.

The National Parks and Wildlife Service (NPWS) 1:25000 Mapping Series (Native Vegetation of the Cumberland Plain)⁵ indicates that there are no remnant native vegetation communities in the vicinity of the site.

5.2.5 Biodiversity, Bushfire & Riparian Lands

The site does *not* contain any ecologically significant 'Terrestrial Biodiversity' as indicated on Council's Natural Resources Biodiversity Map forming part of the HLEP 2013.

5.3 Heritage Significance

5.3.1 Heritage Items

The subject property is *not* listed as an item of Environmental Heritage under Schedule 5, Part 1 of the *Hornsby Local Environmental Plan 2013* (HLEP).

5.3.2 Heritage Conservation Area

The site is located within a Heritage Conservation Area [Area C9 – East Epping Conservation Area] under Schedule 5, Part 2 of the HLEP 2013.

5.3.3 Significant Tree Register

Hornsby Council does *not* currently maintain a Register of Significant Trees other than those listed as heritage items in the HLEP.

5.3.4 General

The 1943 Aerial image of Sydney (SIX Maps) indicates that the site and adjoining properties had been cleared of native vegetation and developed for residential housing at this time. The house at 49A Norfolk was constructed c. 1970. T1, a *Ceratonia siliqua* (Carob tree) within the adjoining property at 49 Norfolk Road is visible in the 1943 aerial image and was probably planted contemporary with the dwelling in this property, being fairly typical of late Victorian and Federation Era plantings. T19, a large *Quercus robur* (English Oak), appears to have been planted c. 1950-1960. 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 1**. 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			Moderate Retention Value				
Medium- 15 to 40 Years								
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 PRIORITIES.

RETENTION VALUE	RECOMMENDED ACTION
“High”	<p>These trees considered worthy of preservation; as such careful consideration should be given to their retention as a priority.</p> <p>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.</p> <p>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.</p>
“Moderate”	<p>The retention of these trees is desirable, but not essential.</p> <p>These trees should be retained as part of any proposed development if possible. However, these trees are considered less critical for retention.</p> <p>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).</p>
“Low”	<p>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.</p> <p>These trees should not be considered as a constraint to the future development of the site.</p>

“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.
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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).⁶

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 of 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.

8 PROPOSED DEVELOPMENT

- 8.1.1 The proposed development includes the subdivision of the property to create four (4) new allotments (proposed Lots 1, 2, 3 & 4). The works will include the demolition of the existing dwelling and driveway within 49A Norfolk Road and the existing in-ground swimming pool within 51 Norfolk Road.
- 8.1.2 A new driveway will be constructed within the access handle to 49A Norfolk Road to service each of the new Lots 1, 2 & 3, together with associated underground services conduits. Part of the driveway (within the TPZ of T1), will be raised to avoid excavation for the pavement sub-grade within the TPZ.
- 8.1.3 New stormwater drainage is also proposed to be installed along the western boundary of the site and through an existing stormwater easement to discharge to the street drainage system in Somerset Street. Parts of the drainage system are proposed to be installed by Horizontal Directional Drilling (HDD) to avoid incursions to the root zones of trees to be retained.

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
<i>Subdivision Plans</i>	ACOR Consultants (CC)	CC210384 D1-D13 [A]	01/11/2021

- 9.1.2 A summary of the impact of the proposed development on each tree within the site is shown in **Appendix 4**. 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 nine (9) trees of low and very low retention value. These include Tree No.s T2, T3 & T4 (Camphor Laurel), T11 (Swamp Oak), T12 (hedge row of Small-leaf Lillypilly), T13 (Lemon), T15 (Japanese Maple) and T23 & T24 (Tree Fern). 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 T11 is completely dead and has no habitat value.
- 9.1.4 The proposed development will also necessitate the removal of five (5) trees of moderate retention value. These include Tree No.s T8 (Soulange Magnolia), T14 (Yulan Magnolia) and T18 (three trees within a hedge row of Leighton Green Cypress). 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 with new trees elsewhere within the site in accordance with **Section 11**.

- 9.1.5 The existing driveway (concrete wheel strips) servicing 49A Norfolk Road is proposed to be demolished and replaced with a new driveway and passing bay within the TPZ of T1 (Carob Tree). In order to minimise excavation and compaction for the pavement sub-grade within the TPZ, the driveway slab is proposed to be elevated and supported on a sand blinding layer, geotextile and strip drainage system. The encroachment to the TPZ is approximately 31%, which exceeds acceptable limits under AS 4970:2009. However, if implemented using the construction methodology as specified, this work will not result in any actual incursion to the root zone and therefore the proposed works will not result in any adverse impact on this tree. The geotextile layer will limit the degree of compaction and the strip drain will permit some moisture penetration and aeration to the root zone. In order to avoid any adverse impact, the existing concrete wheel strips should be demolished in accordance with **Section 10.8**. The new driveway slab should be installed above grade as detailed in accordance with **Section 10.12**. Any required excavation for the new pavement sub-grade within the TPZ should be undertaken in accordance with **Section 10.9**.
- 9.1.6 New underground services are also proposed to be installed within the TPZ of T1 (Carob Tree). Open trenching for the services conduits will result in an encroachment to the TPZ of approximately 12%, which exceeds acceptable limits under AS 4970:2009. However, this tree will tolerate the extent of the encroachment proposed, provided that all open trenching for the services conduits within the TPZ are undertaken using non-destructive excavation methods in accordance with **Section 10.9**.
- 9.1.7 New stormwater pipelines are proposed to be installed by Horizontal Directional Drilling (HDD) within the TPZs of T9 & T10 (Box Elder), T16 (Japanese Maple), T17 (Jacaranda), T18 (hedge row of Leighton Green Cypress), T19 (English Oak) and T34 (Sasanqua Camellia). In all instances, the new pipeline (150mm in diameter) has a proposed Invert Level of approximately 1.2 metres below surface levels, providing a minimum of one (1) metre cover to the top of the pipe. Given the soil conditions in this area (refer **Section 2.1.3**), the level of cover is considered adequate to clear the root plates of all of the subject trees, and therefore the works will not result in any actual incursion to the root zones. The proposed works will not result in any adverse impact on these trees, provided that the stormwater lines are installed by HDD within the TPZs as specified on the Civil Engineering Drawings in accordance with **Section 10.11**.
- 9.1.8 Sections of the proposed stormwater drainage system, including the house connection in proposed Lot 3 [along the northern site boundary, within the TPZ of T19 (English Oak)] and the final northern section of the pipeline within the easement discharging to Somerset Street [within the TPZs of T35 (Murraya hedge), T36 (Jacaranda) and T38 (Chinese Tallow)], are proposed to be installed by open trenching. These sections cannot be installed by HDD due to the required Invert Levels of the pipe. In the case of Trees T19 & T38, the extent of the encroachment to the TPZs is approximately 13%, which exceeds acceptable limits under AS 4970:2009. However, both of these trees will tolerate the level of encroachment proposed, provided that all open trenching for the proposed pipelines within the TPZs undertaken in accordance with **Section 10.11**. It should be noted that the trenching within the TPZ of T38 is relatively shallow (no greater than 300mm). In the case of T35 & T36, open trenching for the pipeline will result in an encroachment of approximately 25% and 27% respectively, which exceeds acceptable limits under AS 4970:2009. Trenching at this proximity has the potential to result in severance and damage to woody roots, which may lead to an adverse impact on these trees. However, provided that all open trenching within the TPZs is undertaken using non-destructive excavation methods in accordance with **Section 10.11**, any adverse impact can be minimised.
- 9.1.9 No other trees will be adversely affected by the proposed development.

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, tining, 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 [**T2, T3, T4, T8, T11, T12, T13, T14, T15, T18 (three trees in the southern end of the row) T23 & T24**] 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 [T5, T6, T7, T9, T10, T16, T17, T18 & T20-T29] 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.

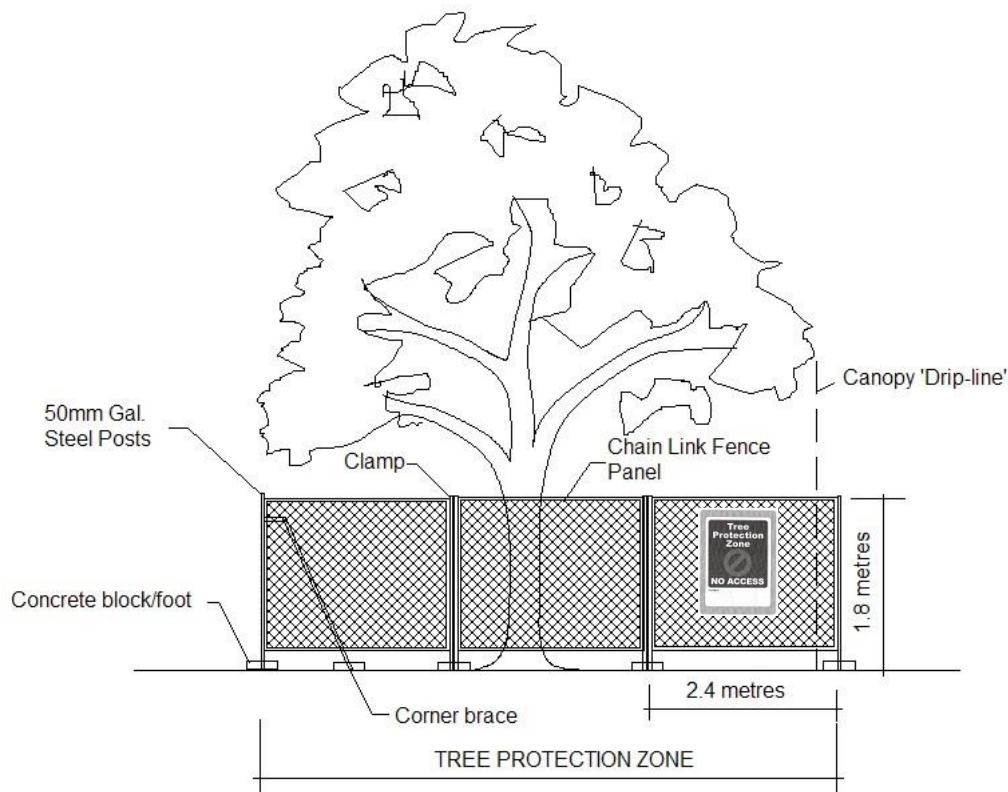


Figure 1 – Detail of Tree Protection Fence

- 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**.

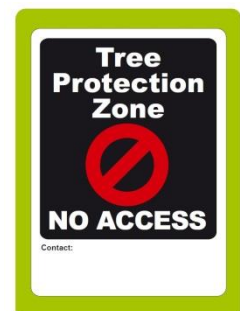


Figure 2 – Detail of Tree Protection Sign

10.6 Trunk Protection

- 10.6.1 Trunk protection boarding shall be erected around Trees [T38] 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 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.

- 10.7.2 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 Existing Turfgrass

No mechanical soil cultivation (using ripping tynes, rotary hoes or the like) is permitted within Tree Protection Zones (TPZs). Where existing turfgrass is proposed to be removed (demolished) within the TPZs of Trees [**any tree nominated for retention**], the turfgrass shall be first treated with a non-selective herbicide with the active constituent Glyphosate (Round-up[®] or equivalent) at the manufacturers recommended rate and allowed to dehisce. Once the turfgrass in the effected area is completely dead, any high grass may be slashed/mown close to ground level.

Any residual vegetation (dead grass etc) may then be carefully scraped-off the surface using a small rubber tracked excavator with a broad sand bucket (i.e. without tynes/teeth), taking care to remove the minimum topsoil necessary (no more than 20mm deep) (refer to **Figure 5**). An observer shall be used to ensure that no woody surface roots of any trees are damaged during this process.



Figure 5 – Showing method for removal of residual surface vegetation from Tree Protection Zones following herbicide treatment and slashing.

10.8.2 Paved Areas

Demolition of paved areas within the Tree Protection Zones (TPZs) of trees [**T1, T9, T10, T16, T25, T26, T27, T35 & T36**] 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 6**). 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 6 – 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. Any imported soil material should be similar in texture to the existing site topsoil.

10.8.3 Structures & Retaining Walls

Demolition of existing walls, kerbs and other structures within the TPZ of trees [T1, T9, T10, T16, T25, T26, T27, T35 & T36] 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] 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 retaining walls, consideration should be given to eliminating continuous strip footings and substituting with pier and beam footings, pier footings (using a post and caisson type wall) or mass wall such as gabions or mass stone that can be placed without a structural footing.
- 10.10.3 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.

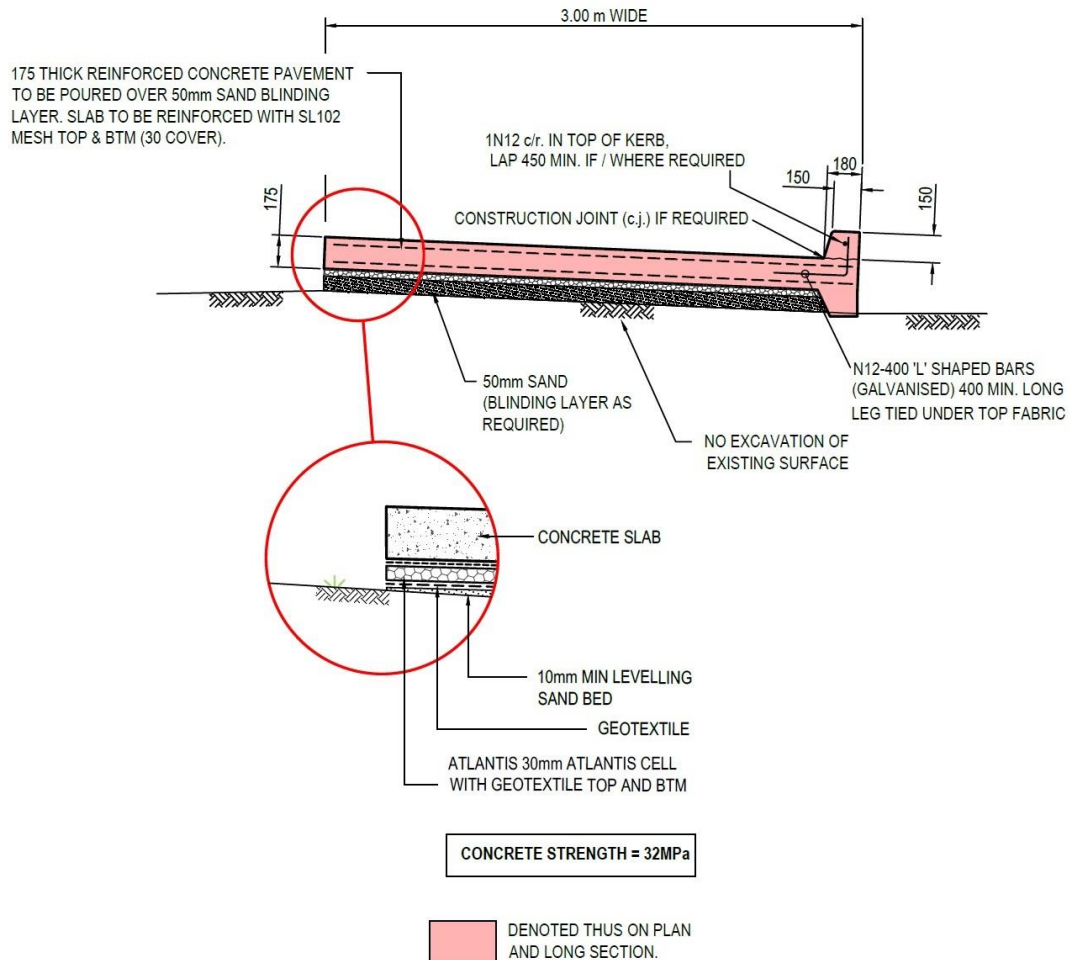
10.11 Underground Services

- 10.11.1 Trenching for underground services and stormwater pipes within the TPZs of Trees [T1, T19 (south side), T35, T36 & T38], 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.
- 10.11.2 Installation of underground services and stormwater pipes within the SRZs of Trees [T9, T10, T16, T17, T18, T19 (west side) & T34], 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 [T1] 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 in accordance with **Figure 7**.



TYPICAL SECTION THROUGH CONCRETE PAVEMENT - TREE PROTECTION ZONE

SCALE 1:20

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Figure 7 - Conceptual driveway slab detail within TPZ of T1 (Carob Tree). (ref: ACOR Consultants (CC) Pty Ltd).

10.13 Root Pruning

10.13.1 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.

10.13.2 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].

11 REPLACEMENT PLANTING

11.1.1 In order to compensate for loss of amenity resulting from the removal of trees to accommodate the proposed development, a minimum number of three (3) new trees capable of attaining a height of at least ten (10) metres at maturity should be planted within the allotment.

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:-

Local native Species:-

- *Syncarpia glomulifera* (Turpentine)
- *Eucalyptus paniculata* (Grey Ironbark)
- *Eucalyptus acmenoides* (White Mahogany)
- *Angophora costata* (Sydney Red Gum)
- *Acmena smithii* (Lillypilly)
- *Elaeocarpus reticulatus* (Blueberry Ash)

Suitable Rainforest Species:-

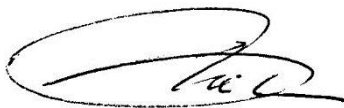
- *Backhousia citriodora* (Lemon-scented Myrtle)
- *Scolopia braunii* (Flintwood)
- *Stenocarpus sinuatus* (Qld Firewheel Tree)
- *Syzygium paniculatum* (Magenta Cherry)
- *Syzygium leuhmannii* (Small Leaf Lillypilly)
- *Waterhousea floribunda* (Weeping Lilly Pilly).

Suitable Exotic species:-

- *Nyssa sylvatica* (Tupelo)
- *Liriodendron tulipifera* (Tulip Tree)
- *Jacaranda mimosifolia* (Jacaranda)
- *Magnolia grandiflora* (Bullbay Magnolia)
- *Quercus palustris* (Pin Oak)
- *Ulmus parvifolia* (Chinese Elm)

Suitable Ornamental Conifers:-

- *Callitris columellaris* (White Cypress Pine)
- *Cupressus funebris* (Chinese Weeping Cypress)
- *Cupressus cashmeriana* (Kashmir Cypress)
- *Cryptomeria japonica* (Japanese Cedar)
- *Chamaecyparis lawsoniana* (Lawson's Cypress)
- *Cedrus atlantica* 'Glauc' (Blue Atlas Cedar)



Andrew Morton

EARTHSCAPE HORTICULTURAL SERVICES

8th November 2021

REFERENCES

¹ Chapman GA & Murphy CL (1989)

Soil Landscapes of the Sydney 1:100,000 Sheet

Soil Conservation Service of NSW. Sydney

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 National Parks and Wildlife Service of NSW (October 2002)

Native Vegetation of the Cumberland Plain - 1:25000 Mapping Series (Map 10 of 16)

NPWS, Sydney NSW

⁶ Council of Standards Australia (August 2009)

AS 4970 – 2009 – Protection of Trees on Development Sites

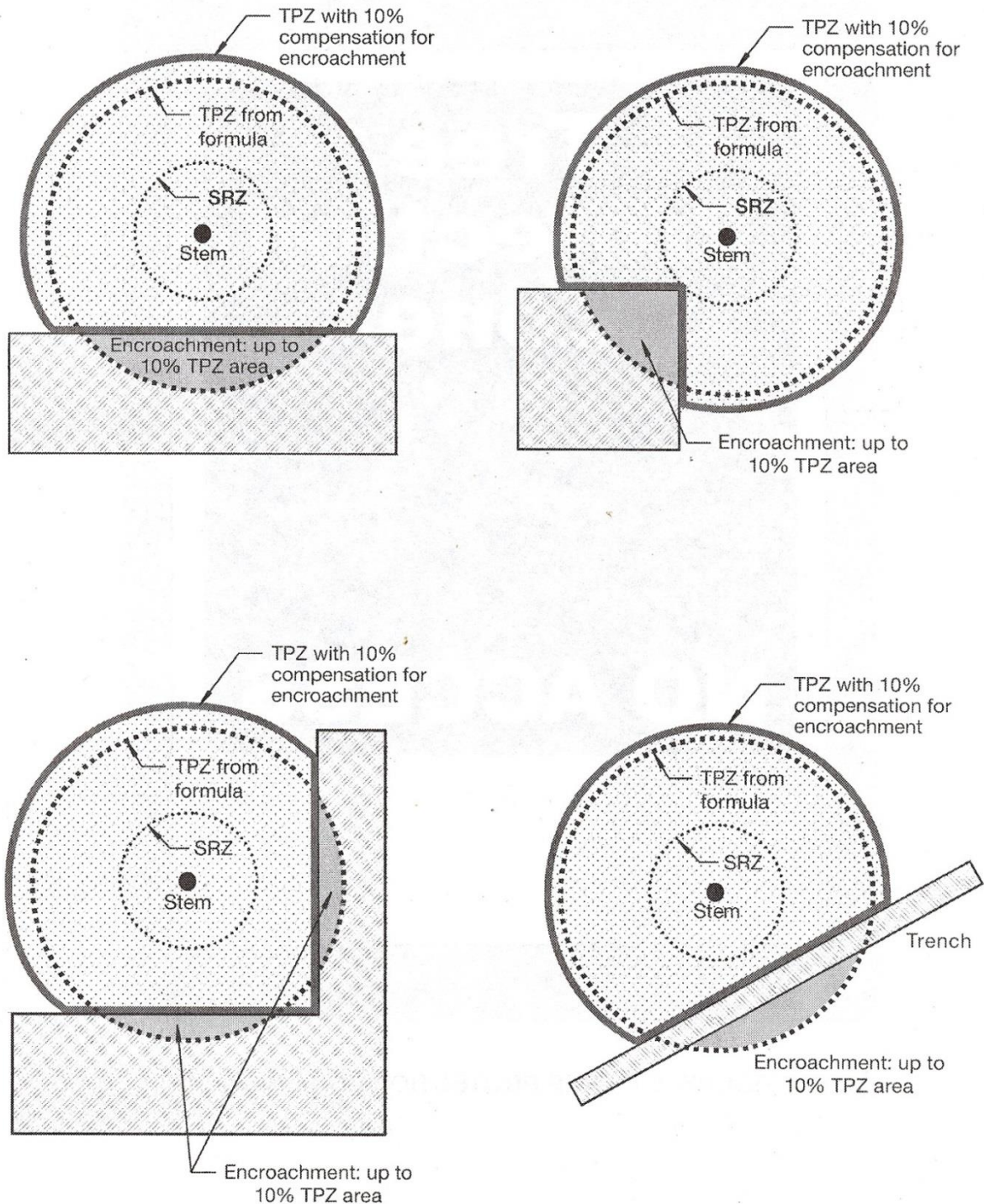
Standards Australia, Sydney

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 or Vulnerable Species as defined under the provisions of the <i>Biodiversity Conservation Act 2016</i> (NSW) or the <i>Environment Protection and Biodiversity Conservation Act 1999</i> .	The subject tree has a very large live crown size exceeding 300m ² 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 200m ² ; 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 100m ² ; 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 the local or state planning controls (Development Control Plan etc).	The subject tree has a medium live crown size exceeding 40m ² ; 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 the local or state planning controls (DCP etc) 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 40m ² 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 known heritage value (or any habitat value)	The tree is scheduled as a potential 'Biosecurity Risk' ('Priority Weed' – formerly 'Noxious Weed') within NSW or within the relevant Local Government Area under the provisions of the <i>Biosecurity Act 2015</i>	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) at 1.4 metres	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	<i>Ceratonia siliqua</i> (Carob tree)	6	9	600	36	M	Appears stable with fair branching structure. NB visibility to trunk and PL+SL branch junctions obscured by Ivy.	Selectively pruned.	Good	Severe vine infestation (English Ivy)	Short 5-15 Years	2	Moderate	Adjoining property
2	<i>Cinnamomum camphora</i> (Camphor Laurel)	10	10	270x2	80	SM	Appears stable with fair branching structure. Exhibits a moderate bark inclusion at 1 metre at junction of co-dominant PLs. Crown suppressed south side due to crowding.	No evidence	Good	No Evidence	Medium 15-40 Years	7	Very Low	On-site
3	<i>Cinnamomum camphora</i> (Camphor Laurel)	11	10	220 + 430	90	SM	Appears stable with poor branching structure. Crown suppressed on the north side due to crowding. Basal sprout. Multiple co-dominant PLs at 2 metres (x3)	No evidence	Good	No Evidence	Medium 15-40 Years	7	Very Low	On-site
4	<i>Cinnamomum camphora</i> (Camphor Laurel)	6	6	130 + 170	24	I	Appears stable with fair branching structure. Exhibits a very prominent lean to the south-west. Crown suppressed on the north-east side due to overshadowing. Moderate dieback with 20% deadwood and 20% epicormic growth.	No evidence	Fair with thinning crown	No Evidence	Short 5-15 Years	7	Very Low	On-site
5	<i>Callistemon viminalis</i> (Weeping Bottlebrush)	5	5	260	25	SM	Appears stable with fair branching structure. Exhibits multiple moderate bark inclusions at 2-3 metres at junctions of SLs & TLs. Crown suppressed north side due previous crowding.	No evidence	Good	No Evidence	Medium 15-40 Years	5	Low	On-site
6	<i>Syagrus romanzoffianum</i> (Cocos Palm)	11	6	250	36	M	Appears stable with sound branching structure.	No evidence	Very Good	No Evidence	Long - more than 40 years	6	Low	Adjoining property
7	<i>Acer negundo</i> (Box Elder)	15	13	400	169	M	Appears stable with sound branching structure.	No evidence	Good	No Evidence	Long - more than 40 years	6	Low	Adjoining property
8	<i>Magnolia soulangeana</i> (Magnolia)	5	5	80x3 + 120	20	SM	Appears stable with sound branching structure. Located close to existing dwelling (<3 metres)	Crown lifted to 2 metres	Good	Low possum defoliation	Medium 15-40 Years	5	Moderate	On-site

APPENDIX 3 - TREE HEALTH AND CONDITION ASSESSMENT SCHEDULE

Tree Identification No.	Species	Height (m)	Spread (m)	Trunk Diameter (mm) at 1.4 metres	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				
9	<i>Acer negundo</i> (Box Elder)	12	12	300x2 + 270	96	M	Appears stable with fair branching structure. Exhibits multiple moderate axial wounds from GL to 2 metres with decay evident.	Selectively pruned & crown lifted to 5 metres	Good	Moderate fungal infection (<i>Auricularia</i> sp.)	Long - more than 40 years	6	Low	On-site
10	<i>Acer negundo</i> (Box Elder)	12	10	306	100	M	Appears stable with sound branching structure. Crown suppressed on the south-west side due to overshadowing. Prominent lean to the north-east.	Crown lifted to 4 metres	Good	No Evidence	Medium 15-40 Years	6	Low	On-site
11	<i>Casuarina glauca</i> (Swamp Oak)	8	1	487	0	OM	Stability suspect with poor branching structure. Dead stag, trunk only remaining.	No evidence	Dead	No Evidence	Nil	7	Very Low	On-site
12	<i>Syzygium luehmianii</i> (Small-leaf Lillypilly) [hedge row]	3	2	140	6	SM	Appears stable with fair branching structure.	Clipped to rectangular form (hedge)	Good	No Evidence	Medium 15-40 Years	5	Low	On-site
13	<i>Citrus sp.</i> (Lemon tree)	5	5	120 + 70	17.5	M	Appears stable with fair branching structure. Exhibits multiple moderate wounds due to sunburn with some decay evident.	SLs & TLs lopped	.Fair	Low borer infestation	Short 5-15 Years	6	Very Low	On-site
14	<i>Magnolia denudata</i> (Yulan Magnolia)	8	8	236	56	SM	Appears stable with sound branching structure. Prominent lean to the east.	No evidence	Good	Low Possum defoliation	Medium 15-40 Years	4	Moderate	On-site
15	<i>Acer palmatum</i> (Japanese Maple)	7	8	240x2	40	M	Appears stable with sound branching structure. Exhibits some dieback with 10% deadwood and 25% epicormic growth.	No evidence	Fair with slightly thinning crown	No Evidence	Short 5-15 Years	4	Low	On-site
16	<i>Acer palmatum</i> (Japanese Maple)	6	8	160 + 140x2 + 100	40	M	Appears stable with sound branching structure. Exhibits multiple small wounds to TLs due to sunburn	No evidence	Good	No Evidence	Medium 15-40 Years	4	Moderate	On-site
17	<i>Jacaranda mimosifolia</i> (Jacaranda)	12	15	596	135	M	Appears stable with fair branching structure. Exhibits multiple small to moderate wounds due to previous branch loss (storm damage).	Selectively crown thinned & deadwooded.	Good	No Evidence	Long - more than 40 years	3	High	On-site

		APPENDIX 3 - TREE HEALTH AND CONDITION ASSESSMENT SCHEDULE												
Tree Identification No.	Species	Height (m)	Spread (m)	Trunk Diameter (mm) at 1.4 metres	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				
18	<i>Cupressocyparis x leylandii</i> 'Leighton Green' (Leyland Cypress) [hedge row]	5	2	150	10	SM	Appears stable with fair branching structure.	Clipped to rectangular form (hedge)	Very Good	No Evidence	Long - more than 40 years	5	Moderate	On-site
19	<i>Quercus robur</i> (English Oak)	16	21	1000	294	M	Appears stable with sound branching structure. Exhibits multiple axial wounds on lower trunk extending to PL due to suspected fungal infection.	Selectively crown thinned & deadwooded.	Very Good	Low Possum defoliation. Suspected Botryosphaeria sp. infection	Medium 15-40 Years	2	High	Adjoining property
20	<i>Hakea salicifolia</i> (Willow-leaf Hakea)	6	5	150	20	SM	Appears stable with fair branching structure. Exhibits a prominent lean to the south-west.	Lower SLs south side lopped over boundary	Good	No Evidence	Short 5-15 Years	5	Low	Adjoining property
21	<i>Melaleuca styphelioides</i> (Prickly Paperbark)	7	4	150	20	SM	Appears stable with sound branching structure.	No evidence	Good	No Evidence	Long - more than 40 years	5	Moderate	Adjoining property
22	<i>Casuarina glauca</i> (Swamp Oak)	13	6	160 + 220	60	SM	Appears stable with poor branching structure. Main leader broken out at 4 metres. Exhibits multiple co-dominant leaders emanating from old wound (epicormics) with obtuse bend.	Crown lifted to 2 metres	Good	No Evidence	Short 5-15 Years	4	Low	Adjoining property
23	<i>Cyathea cooperi</i> (Rough Tree Fern)	3.5	2	140	1	SM	Appears stable with sound branching structure.	No evidence	Good	No Evidence	Short 5-15 Years	5	Low	On-site
24	<i>Cyathea cooperi</i> (Rough Tree Fern)	5	2	160	4	M	Appears stable with fair branching structure. Crown suppressed on the north side due to overshadowing.	No evidence	Good	No Evidence	Short 5-15 Years	5	Low	On-site
25	<i>Macadamia tetraphylla</i> (Macadamia Nut)	6	5.5	100x3	33	I	Appears stable with sound branching structure.	No evidence	Very Good	No Evidence	Long - more than 40 years	5	Moderate	Adjoining property

APPENDIX 3 - TREE HEALTH AND CONDITION ASSESSMENT SCHEDULE

Tree Identification No.	Species	Height (m)	Spread (m)	Trunk Diameter (mm) at 1.4 metres	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				
26	<i>Melaleuca liniariifolia</i> (Narrow-leaved Paperbark)	7	6	270	18	M	Appears stable with sound branching structure.	No evidence	Fair with slightly thinning crown	No Evidence	Medium 15-40 Years	4	Moderate	Adjoining property
27	<i>Melaleuca styphelioides</i> (Prickly Paperbark)	8	5	160	35	SM	Appears stable with sound branching structure.	No evidence	Very Good	No Evidence	Long - more than 40 years	4	Moderate	Adjoining property
28	<i>Syzygium australe</i> (Lilly Pilly)	4.5	4	150	14	I	Appears stable with sound branching structure.	No evidence	Very Good	No Evidence	Long - more than 40 years	5	Moderate	Adjoining property
29	<i>Melaleuca styphelioides</i> (Prickly Paperbark)	8	5	200	25	SM	Appears stable with fair branching structure. Exhibits a moderate bark inclusion at 3 metres at junction of co-dominant PLs.	No evidence	Very Good	No Evidence	Long - more than 40 years	4	Moderate	Adjoining property
30	<i>Melaleuca styphelioides</i> (Prickly Paperbark)	7	4	130	12	SM	Appears stable with fair branching structure. Exhibits a prominent lean to the north.	Crown lifted to 4 metres	Good	No Evidence	Medium 15-40 Years	5	Low	Adjoining property
31	<i>Camellia sasanqua</i> (Sasanqua Camellia)	5	2	100	8	SM	Appears stable with poor branching structure. Exhibits multiple wounds and branch stubs due previous pruning with multiple epicormic sprouts.	All SLs lopped (crown restored)	Good	No Evidence	Short 5-15 Years	5	Low	Adjoining property
32	<i>Eucalyptus crebra</i> (Narrow-leaved Ironbark)	12	5	239	45	I	Appears stable with sound branching structure.	No evidence	Very Good	No Evidence	Long - more than 40 years	4	Moderate	Adjoining property
33	<i>Camellia japonica</i> (Camellia)	3.5	3.5	100x4	12.25	M	Appears stable with fair branching structure. Exhibits minor dieback with 5% deadwood.	No evidence	Fair with slightly thinning crown	No Evidence	Medium 15-40 Years	5	Low	On-site
34	<i>Camellia sasanqua</i> (Sasanqua Camellia)	6	5	100x6	30	M	Appears stable with sound branching structure.	No evidence	Very Good	No Evidence	Long - more than 40 years	5	Moderate	Adjoining property

APPENDIX 3 - TREE HEALTH AND CONDITION ASSESSMENT SCHEDULE

Tree Identification No.	Species	Height (m)	Spread (m)	Trunk Diameter (mm) at 1.4 metres	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				
35	<i>Murraya paniculata</i> (Murraya) [hedge row]	4.5	2.5	50x6	11.25	M	Appears stable with fair branching structure.	Clipped to rectangular form (hedge)	Good	No Evidence	Medium 15-40 Years	5	Low	Adjoining property
36	<i>Jacaranda mimosifolia</i> (Jacaranda)	10	11	270 + 350	55	M	Appears stable with fair branching structure.	Previously lopped at 5-6 metres (crown restored). Selectively pruned to clear powerlines	Fair with slightly thinning crown	No Evidence	Medium 15-40 Years	3	Moderate	Adjoining property
37	<i>Sapium sebiferum</i> (Chinese Tallow tree)	10	5	220	25	SM	Appears stable with sound branching structure. Low live crown ratio due to previous pruning.	Crown lifted to 5 metres to clear powerlines	Good	No Evidence	Short 5-15 Years	5	Low	Nature strip
38	<i>Sapium sebiferum</i> (Chinese Tallow tree)	7	6	180x2 + 140x2	30	M	Appears stable with sound branching structure.	Crown lifted to 3 metres	Good	No Evidence	Medium 15-40 Years	4	Moderate	Nature strip
39	<i>Ulmus parvifolia</i> (Chinese Elm)	6	11	200 + 150x2	55	SM	Appears stable with fair branching structure.	Previously lopped at 4 metres (crown restored)	Good	No Evidence	Medium 15-40 Years	5	Low	Adjoining property

APPENDIX 4 - IMPACT ASSESSMENT SCHEDULE

Tree Identification No.	Species	Construction Tolerance	Tree Protection Zone (m R)	Structural Root Zone (m R)	Minimum Setback Distance (tangent to root plate)	TPZ (m²)	Incursions To Root Zone &/or Canopy	Likely Impact	Recommendation
1	<i>Ceratonia siliqua</i> (Carob tree)	M	7.2	2.8	4.9	162.8	Existing driveway (concrete wheel strips) offset 1.7 metres north to be demolished within TPZ. Proposed new driveway (raised concrete slab over sand blinding layer and drainage cell) offset 2 metres north (partially within footprint of existing driveway) at RL98.187 (250mm above grade - CH 6.50) to 97.888 (250mm above grade - CH 20.00). Encroachment to TPZ = 31%. No excavation for pavement sub-grade within TPZ - no actual incursion to root zone. Proposed services trench (0.6-1.0 metres deep) offset 4.5 metres north. Open trenching for services conduits within TPZ. Encroachment to TPZ = 12%.	Extent of encroachment to TPZ exceeds acceptable limits under AS 4970:2009. However, this tree will tolerate the extent of encroachment proposed, provided that all proposed works within the TPZ are undertaken as recommended.	Retain in accordance with recommended Tree Protection Measures (Section 10). Demolish existing driveway wheel strips within TPZ in accordance with Section 10.8. Install driveway slab above grade as specified, in accordance with Section 10.12. Undertake all open trenching from the proposed services conduits within the TPZ in accordance with Section 10.11.
2	<i>Cinnamomum camphora</i> (Camphor Laurel)	M	4.8	2.4	3.3	72.3	Located within footprint of proposed driveway and services trench.	Proposed works will necessitate removal.	Remove tree.
3	<i>Cinnamomum camphora</i> (Camphor Laurel)	M	6.0	2.6	4.1	113.0	Located within footprint of proposed driveway and services trench.	Proposed works will necessitate removal.	Remove tree.
4	<i>Cinnamomum camphora</i> (Camphor Laurel)	M	3.0	2.0	2.0	28.3	Located within footprint of proposed driveway.	Proposed works will necessitate removal.	Remove tree.
5	<i>Callistemon viminalis</i> (Weeping Bottlebrush)	M	3.1	1.9	2.1	30.6	No proposed works within TPZ.	No adverse impact.	To be retained - no special tree protection measures required.

APPENDIX 4 - IMPACT ASSESSMENT SCHEDULE

Tree Identification No.	Species	Construction Tolerance	Tree Protection Zone (m R)	Structural Root Zone (m R)	Minimum Setback Distance (tangent to root plate)	TPZ (m²)	Incursions To Root Zone &/or Canopy	Likely Impact	Recommendation
6	<i>Syagrus romanzoffianum</i> (Cocos Palm)	G	4.0	1.9	2.7	50.2	No proposed works within TPZ.	No adverse impact.	To be retained - no special tree protection measures required.
7	<i>Acer negundo</i> (Box Elder)	M	7.0	2.4	4.8	153.9	No proposed works within TPZ.	No adverse impact.	To be retained - no special tree protection measures required.
8	<i>Magnolia soulangeana</i> (Magnolia)	M	3.0	1.7	2.0	28.3	Located within Indicative Building Envelope (IBE) for proposed Lot 2.	Any future dwelling located within the IBE will necessitate the removal of this tree.	Remove tree. Undertake replacement planting with a new tree elsewhere within the site to compensate for loss of amenity in accordance with Section 111
9	<i>Acer negundo</i> (Box Elder)	M	6.0	2.4	4.1	113.0	IBE offset 5 metres east. Potential encroachment to TPZ = 1%. Proposed 150mmØ stormwater pipeline offset 0.4 metres east at IL94.80 (1.2 metres below grade - 1 metre cover) to be installed by Horizontal Directional Drilling (HDD). No actual incursion to root zone.	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 stormwater pipeline within TPZ by HDD in accordance with Section 10.11.
10	<i>Acer negundo</i> (Box Elder)	M	5.0	2.1	3.4	78.5	IBE offset 3.8 metres south-east. Potential encroachment to TPZ = 1%. Proposed 150mmØ stormwater pipeline offset 1.3 metres west at IL94.80 (1.2 metres below grade - 1 metre cover) to IL 94.17 (1.1 metres below grade) to be installed by Horizontal Directional Drilling (HDD). No actual incursion to root zone.	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 stormwater pipeline within TPZ by HDD in accordance with Section 10.11.
11	<i>Casuarina glauca</i> (Swamp Oak)	M	5.8	2.5	4.0	107.4	Proposed 150mmØ stormwater pipeline offset 0.5 metres west at IL94.80 (1.2 metres below grade - 1 metre cover) to IL 94.17 (1.1 metres below grade) to be installed by Horizontal Directional Drilling (HDD). No actual incursion to root zone.	No adverse impact.	Remove tree - completely dead.

APPENDIX 4 - IMPACT ASSESSMENT SCHEDULE

Tree Identification No.	Species	Construction Tolerance	Tree Protection Zone (m R)	Structural Root Zone (m R)	Minimum Setback Distance (tangent to root plate)	TPZ (m²)	Incursions To Root Zone &/or Canopy	Likely Impact	Recommendation
12	<i>Syzygium luehmannii</i> (Small-leaf Lillypilly) [hedge row]	M	1.7	1.5	1.5	8.9	Located within footprint of proposed driveway, future driveway extension (to future dwelling) and On-site Stormwater Detention (OSD) tank.	Proposed works will necessitate removal.	Remove hedge row of trees.
13	<i>Citrus sp.</i> (Lemon tree)	M	3.0	1.6	2.0	28.3	Located within 1 metre of IBE and future driveway extension.	Any future dwelling located within the IBE will necessitate the removal of this tree.	Remove tree.
14	<i>Magnolia denudata</i> (Yulan Magnolia)	M	4.5	1.8	3.1	63.6	Located within Indicative Building Envelope (IBE) for proposed Lot 2.	Any future dwelling located within the IBE will necessitate the removal of this tree.	Remove tree. Undertake replacement planting with a new tree elsewhere within the site to compensate for loss of amenity in accordance with Section 111
15	<i>Acer palmatum</i> (Japanese Maple)	M	4.5	2.0	3.1	63.6	IBE offset 1.3 metres east and 4.2 metres south.	Any future dwelling located within the IBE will necessitate the removal of this tree.	Remove tree.
16	<i>Acer palmatum</i> (Japanese Maple)	M	4.5	2.0	3.1	63.6	IBE offset 5.6 metres east and 4.4 metres south. Proposed 150mmØ stormwater pipeline offset 3.7 metres north at IL95.22 (0.8 metres below grade) to IL 94.17 (1.1 metres below grade) to be installed by Horizontal Directional Drilling (HDD). No actual incursion to root zone.	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 stormwater pipeline within TPZ by HDD in accordance with Section 10.11.
17	<i>Jacaranda mimosifolia</i> (Jacaranda)	M	8.0	2.7	5.4	201.0	IBE offset 6.5 metres east and 6.3 metres south. Potential encroachment to TPZ from any future dwelling within IBE = 10%. Proposed 150mmØ stormwater pipeline offset 3.7 metres north at IL95.22 (0.8 metres below grade) to IL 94.17 (1.1 metres below grade) to be installed by Horizontal Directional Drilling (HDD). No actual incursion to root zone.	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 stormwater pipeline within TPZ by HDD 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)	Minimum Setback Distance (tangent to root plate)	TPZ (m²)	Incursions To Root Zone &/or Canopy	Likely Impact	Recommendation
18	<i>Cupressocyparis x leylandii</i> 'Leighton Green' (Leyland Cypress) [hedge row]	M	2.5	1.6	1.7	19.6	Proposed 150mmØ stormwater pipeline offset 0.4 metres west at IL94.17 (1.1 metres below grade) to IL93.70 (1.2 metres below grade) to be installed by Horizontal Directional Drilling (HDD). No actual incursion to root zone. Proposed SW junction pit located within SRZ of three trees in row.	No adverse impact, provided that all proposed works within TPZ are undertaken as recommended. Three trees in row will need to be removed to accommodate stormwater junction pit.	Remove 3 trees in row to accommodate junction pit. Retain remainder in accordance with recommended Tree Protection Measures (Section 10). Install stormwater pipeline within TPZ by HDD in accordance with Section 10.11. Remove three trees to accommodate stormwater junction pit as indicated on Appendix 7.
19	<i>Quercus robur</i> (English Oak)	M	12.0	3.6	8.2	452.2	IBE offset 6.9 metres south. Potential encroachment to TPZ from any future dwelling within IBE = 9%. Proposed 150mmØ stormwater pipeline offset 4.8 metres west at IL93.68 (1.2 metres below grade) to 92.55 (1.25 metres below grade) to be installed by Horizontal Directional Drilling (HDD). No actual incursion to root zone. Proposed 150mmØ stormwater pipeline offset 6.5 metres south at IL? (assumed 500mm below grade) to be installed by open trenching. Potential encroachment to TPZ = 13%.	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 stormwater pipeline to west within TPZ by HDD in accordance with Section 10.11. Undertake all open trenching for stormwater pipeline to the south in accordance with Section 10.11.
20	<i>Hakea salicifolia</i> (Willow-leaf Hakea)	M	2.5	1.6	1.7	19.6	IBE offset 1.4 metres south. Potential encroachment to TPZ from any future dwelling within IBE = 17%.	Excavations for the foundations of any future dwelling within the IBE have the potential to result in an adverse impact on this tree.	To be retained - no special tree protection measures required.
21	<i>Melaleuca styphelioides</i> (Prickly Paperbark)	M	2.5	1.6	1.7	19.6	No proposed works within TPZ.	No adverse impact.	To be retained - no special tree protection measures required.
22	<i>Casuarina glauca</i> (Swamp Oak)	M	3.5	1.8	2.4	38.5	IBE offset 1.6 metres south. Potential encroachment to TPZ from any future dwelling within IBE = 21%.	Excavations for the foundations of any future dwelling within the IBE have the potential to result in an adverse impact on this tree.	To be retained - no special tree protection measures required.

APPENDIX 4 - IMPACT ASSESSMENT SCHEDULE

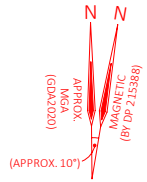
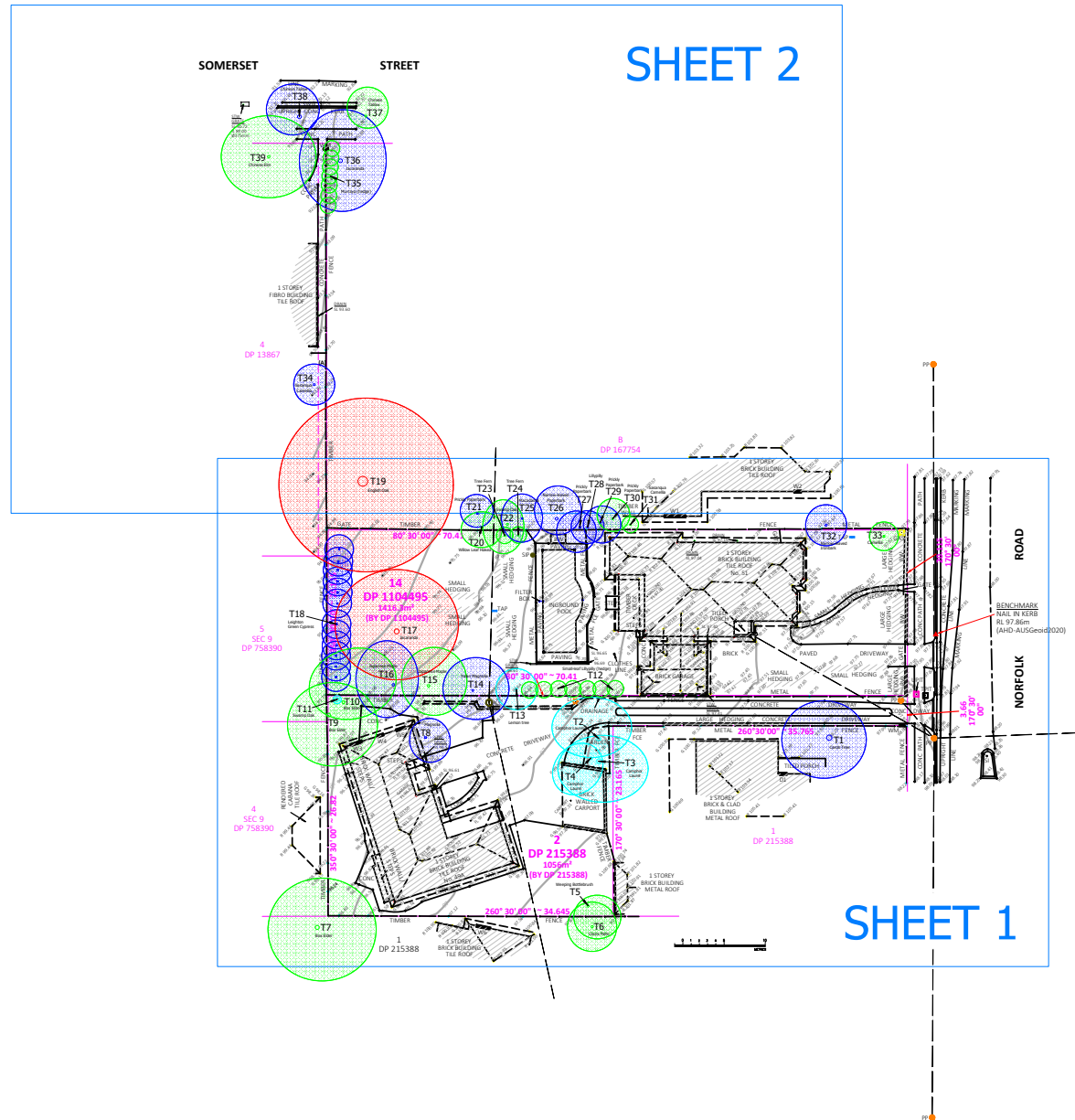
Tree Identification No.	Species	Construction Tolerance	Tree Protection Zone (m R)	Structural Root Zone (m R)	Minimum Setback Distance (tangent to root plate)	TPZ (m²)	Incursions To Root Zone &/or Canopy	Likely Impact	Recommendation
23	<i>Cyathea cooperi</i> (Rough Tree Fern)	G	2.0	1.6	1.6	12.6	Located within 1 metre of IBE.	Proposed works will necessitate removal.	Remove tree.
24	<i>Cyathea cooperi</i> (Rough Tree Fern)	G	2.0	1.7	1.7	12.6	Located within 1 metre of IBE.	Proposed works will necessitate removal.	Remove tree.
25	<i>Macadamia tetraphylla</i> (Macadamia Nut)	M	3.0	1.5	2.0	28.3	IBE offset 2.4 metres south. Potential encroachment to TPZ from any future dwelling within IBE = 6%.	Potential encroachment to the root zone is less than 10% of the TPZ, which is considered within acceptable limits under AS 4970:2009. No adverse impact.	To be retained - no special tree protection measures required.
26	<i>Melaleuca liniariifolia</i> (Narrow-leaved Paperbark)	M	3.2	2.1	2.2	33.0	Existing pool equipment housing and pool coping offset 1.9 metres south to be demolished within TPZ.	No adverse impact, provided that all proposed works within TPZ are undertaken as recommended.	Retain in accordance with recommended Tree Protection Measures (Section 10). Demolish existing pool equipment housing and pool coping within TPZ in accordance with Section 10.8.
27	<i>Melaleuca styphelioides</i> (Prickly Paperbark)	M	3.0	1.6	2.0	28.3	Existing pool equipment housing and pool coping offset 1.9 metres south to be demolished within TPZ.	No adverse impact, provided that all proposed works within TPZ are undertaken as recommended.	Retain in accordance with recommended Tree Protection Measures (Section 10). Demolish existing pool equipment housing and pool coping within TPZ in accordance with Section 10.8.
28	<i>Syzygium australe</i> (Lilly Pilly)	M	2.5	1.6	1.7	19.6	Existing pool coping offset 2.0 metres south to be demolished within TPZ.	No adverse impact, provided that all proposed works within TPZ are undertaken as recommended.	Retain in accordance with recommended Tree Protection Measures (Section 10). Demolish existing pool equipment housing and pool coping within TPZ in accordance with Section 10.8.
29	<i>Melaleuca styphelioides</i> (Prickly Paperbark)	M	2.5	1.8	1.8	19.6	No proposed works within TPZ.	No adverse impact.	To be retained - no special tree protection measures required.
30	<i>Melaleuca styphelioides</i> (Prickly Paperbark)	M	2.5	1.5	1.7	19.6	No proposed works within TPZ.	No adverse impact.	To be retained - no special tree protection measures required.

APPENDIX 4 - IMPACT ASSESSMENT SCHEDULE

Tree Identification No.	Species	Construction Tolerance	Tree Protection Zone (m R)	Structural Root Zone (m R)	Minimum Setback Distance (tangent to root plate)	TPZ (m²)	Incursions To Root Zone &/or Canopy	Likely Impact	Recommendation
31	<i>Camellia sasanqua</i> (Sasanqua Camellia)	M	2.0	1.4	1.4	12.6	No proposed works within TPZ.	No adverse impact.	To be retained - no special tree protection measures required.
32	<i>Eucalyptus crebra</i> (Narrow-leaved Ironbark)	P	2.9	1.9	1.9	25.8	No proposed works within TPZ.	No adverse impact.	To be retained - no special tree protection measures required.
33	<i>Camellia japonica</i> (Camellia)	M	2.2	1.7	1.7	14.6	No proposed works within TPZ.	No adverse impact.	To be retained - no special tree protection measures required.
34	<i>Camellia sasanqua</i> (Sasanqua Camellia)	M	3.0	1.8	2.0	28.3	Proposed 150mmØ stormwater pipeline offset 4.8 metres east at IL93.68 (1.2 metres below grade) to 92.55 (1.25 metres below grade) to be installed by Horizontal Directional Drilling (HDD). No actual incursion to root zone.	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 stormwater pipeline within TPZ by HDD in accordance with Section 10.11.
35	<i>Murraya paniculata</i> (Murraya) [hedge row]	M	2.0	1.5	1.5	12.6	Proposed 150mmØ stormwater pipeline offset 0.7 metres west at 92.55 (1.25 metres below grade) to IL92.13 (600mm below grade). Open trenching for pipeline within TPZ/SRZ. Encroachment to TPZ = 25%.	Extent of encroachment to TPZ exceeds acceptable limits under AS 4970:2009. However, this tree will tolerate the extent of encroachment proposed, provided that all proposed works within the TPZ are undertaken as recommended.	Retain in accordance with recommended Tree Protection Measures (Section 10). Undertake all open trenching for stormwater pipeline to the east in accordance with Section 10.11.
36	<i>Jacaranda mimosifolia</i> (Jacaranda)	M	6.0	2.4	4.1	113.0	Proposed 150mmØ stormwater pipeline offset 0.7 metres west at 92.55 (1.25 metres below grade) to IL92.13 (600mm below grade). Open trenching for pipeline within TPZ/SRZ. Encroachment to TPZ = 27%.	Extent of encroachment to TPZ exceeds acceptable limits under AS 4970:2009. However, this tree will tolerate the extent of encroachment proposed, provided that all proposed works within the TPZ are undertaken as recommended.	Retain in accordance with recommended Tree Protection Measures (Section 10). Undertake all open trenching for stormwater pipeline to the east in accordance with Section 10.11.
37	<i>Sapium sebiferum</i> (Chinese Tallow tree)	M	3.0	1.8	2.0	28.3	No proposed works within TPZ.	No adverse impact.	To be retained - no special tree protection measures required.

APPENDIX 4 - IMPACT ASSESSMENT SCHEDULE

Tree Identification No.	Species	Construction Tolerance	Tree Protection Zone (m R)	Structural Root Zone (m R)	Minimum Setback Distance (tangent to root plate)	TPZ (m²)	Incursions To Root Zone &/or Canopy	Likely Impact	Recommendation
38	<i>Sapium sebiferum</i> (Chinese Tallow tree)	M	4.8	2.4	3.3	72.3	Proposed 2 x 200 x 100mm RHS stormwater pipeline offset 2.4 metres east at IL92.13 (200mm below grade). Open trenching for pipeline within TPZ. Potential encroachment to TPZ = 13%.	Extent of encroachment to TPZ exceeds acceptable limits under AS 4970:2009. However, this tree will tolerate the extent of encroachment proposed, provided that all proposed works within the TPZ are undertaken as recommended.	Retain in accordance with recommended Tree Protection Measures (Section 10). Undertake all open trenching for stormwater pipeline to the east in accordance with Section 10.11.
39	<i>Ulmus parvifolia</i> (Chinese Elm)	M	5.5	2.0	3.7	95.0	No proposed works within TPZ.	No adverse impact.	To be retained - no special tree protection measures required.



LEGEND
TREE RETENTION VALUES

- HIGH
- MODERATE
- LOW
- VERY LOW

APPENDIX 5
TREE LOCATION PLAN SHOWING
TREE RETENTION VALUES
 49A + 51 NORFOLK ROAD, EPPING, NSW



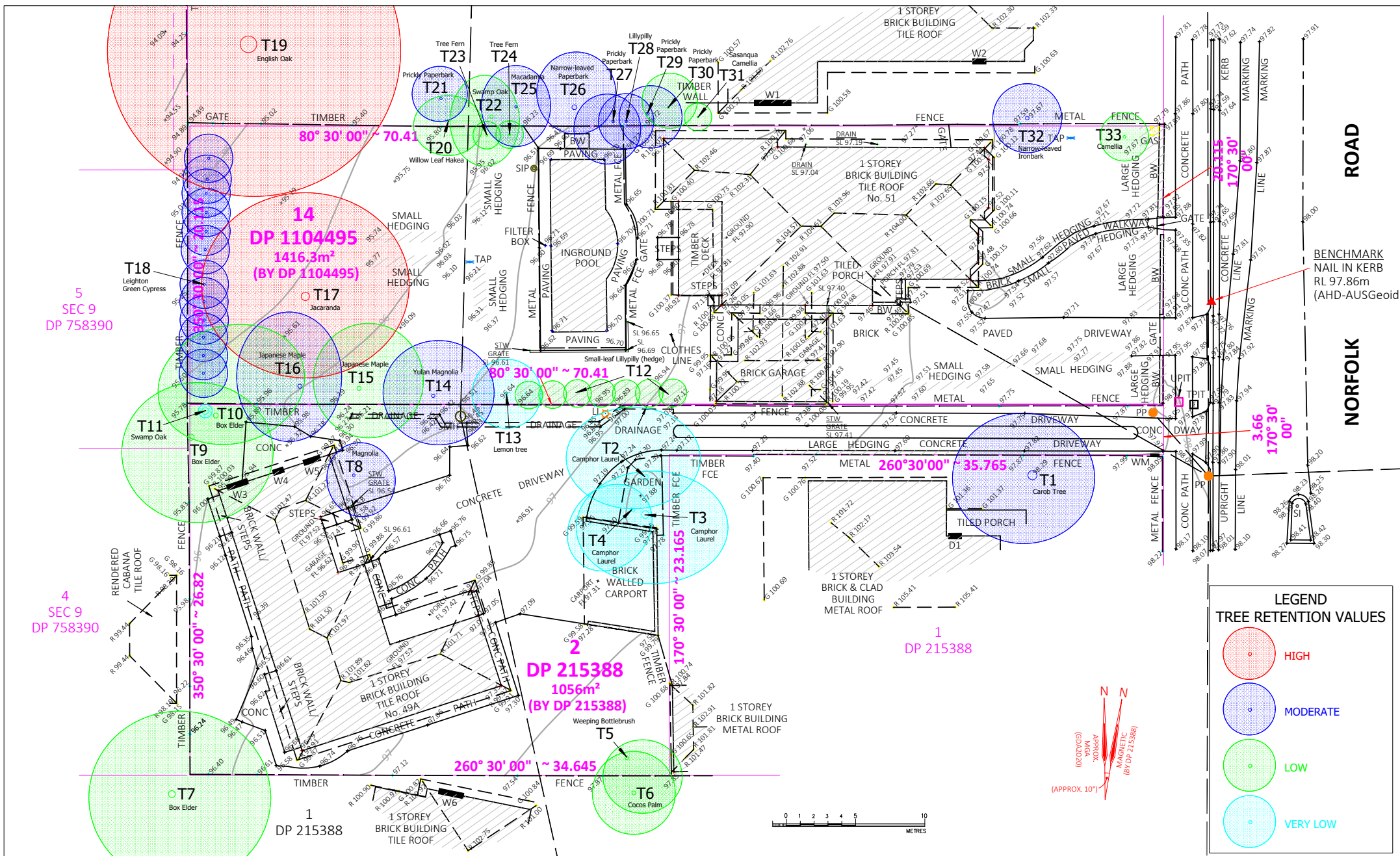
Earthscape Horticultural Services
 Arboricultural and Horticultural Consultants
 PO Box 364
 BEROWRA NSW 2081
 Ph: 02 9456 4787
 Fax: 02 9456 5757 e: earthscape@iinet.net.au

Based on the Survey Drawing
 prepared by Surveyplus
 Dwg Ref No. 20489_DET_1A
 Dated 03/09/2021

DWG No. T21-0916/01 [A]

KEY PLAN

DATE: 16/09/2021



APPENDIX 5
TREE LOCATION PLAN SHOWING
TREE RETENTION VALUES
49A + 51 NORFOLK ROAD, EPPING, NSW



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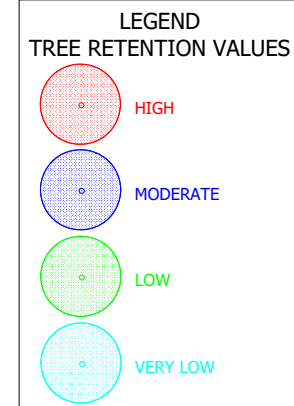
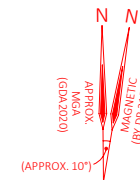
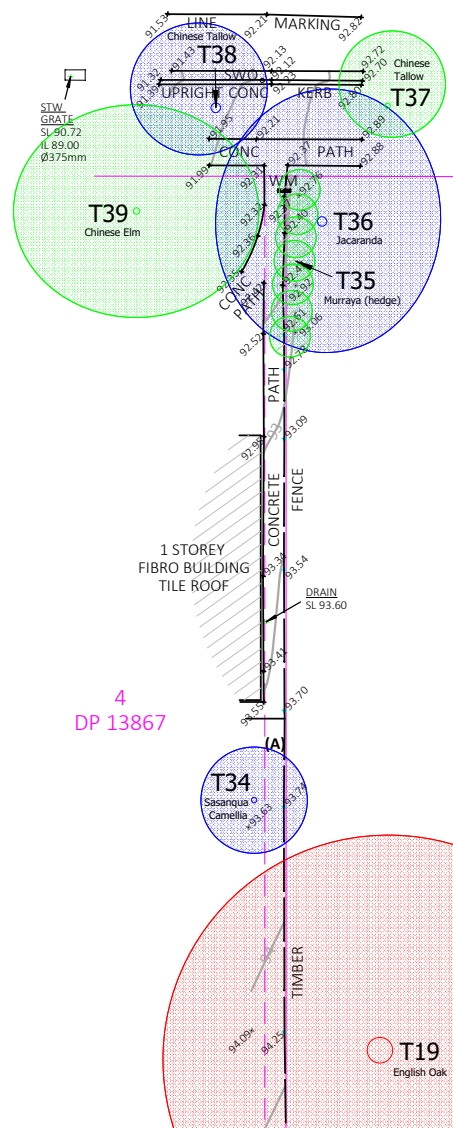
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Dated 03/09/2021

DWG No. T21-0916/01 [A]

SHEET 1

DATE: 16/09/2021

STREET



49A + 51 NORFOLK ROAD, EPPING, NSW



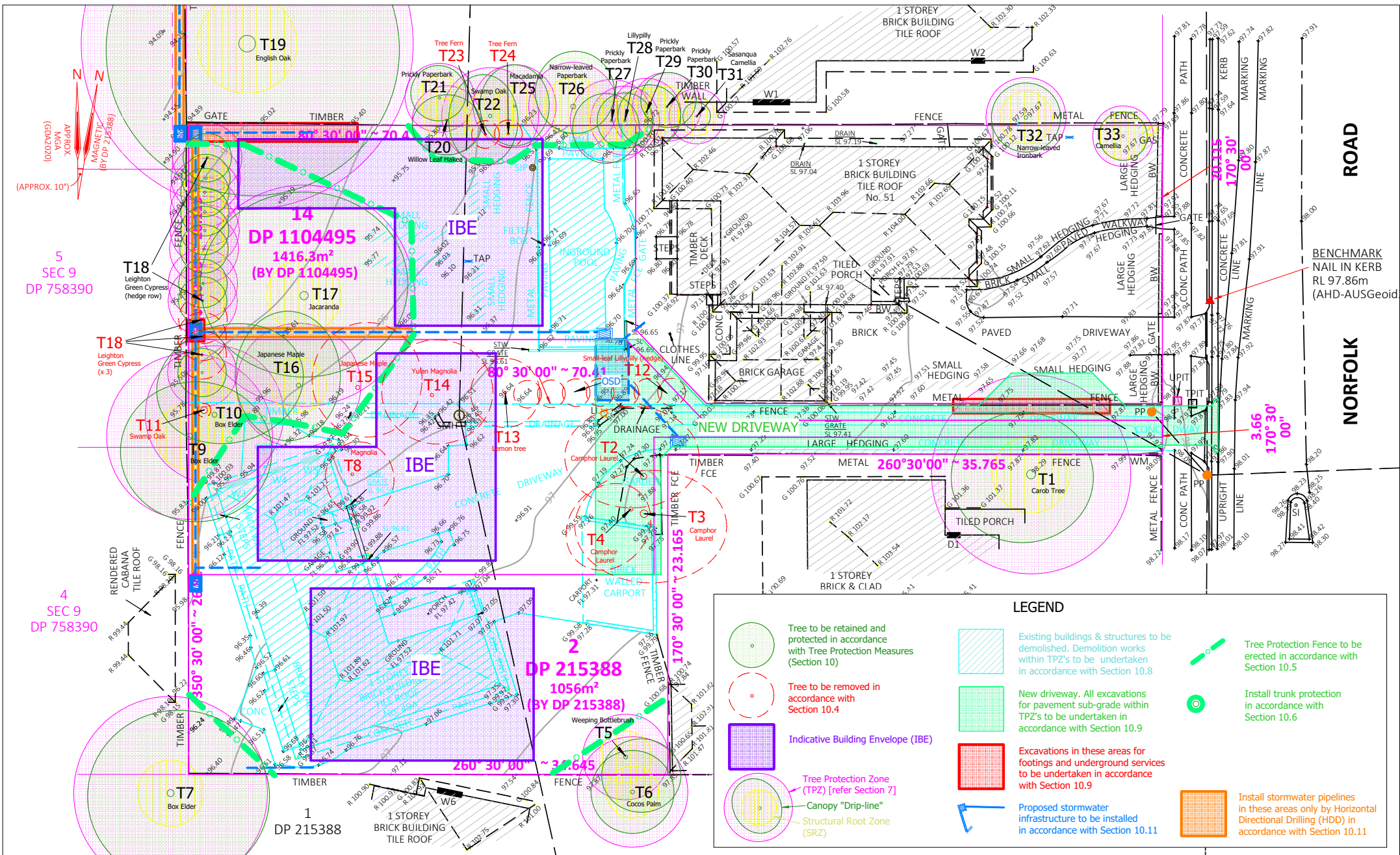
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Dated 03/09/2021

DWG No. T21-0916/01 [A]

SHEET 2

DATE: 16/09/2021



APPENDIX 6 TREE PROTECTION PLAN

49A + 51 NORFOLK ROAD, EPPING, NSW



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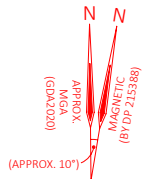
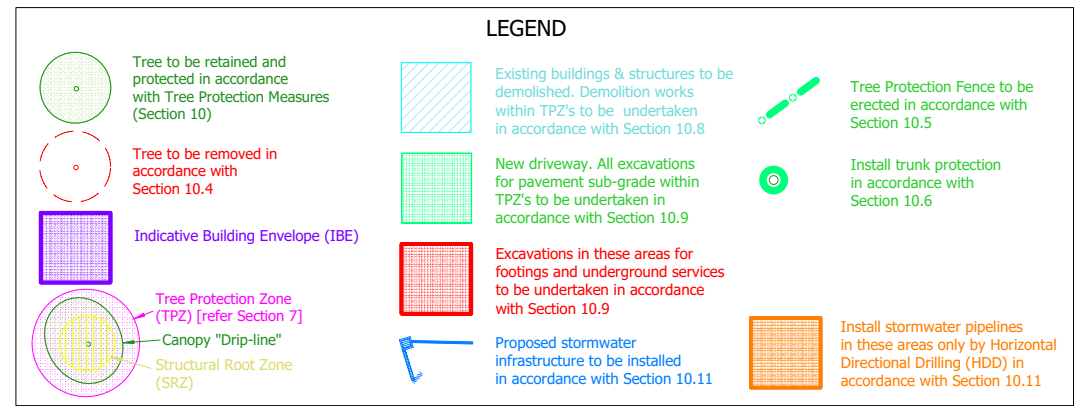
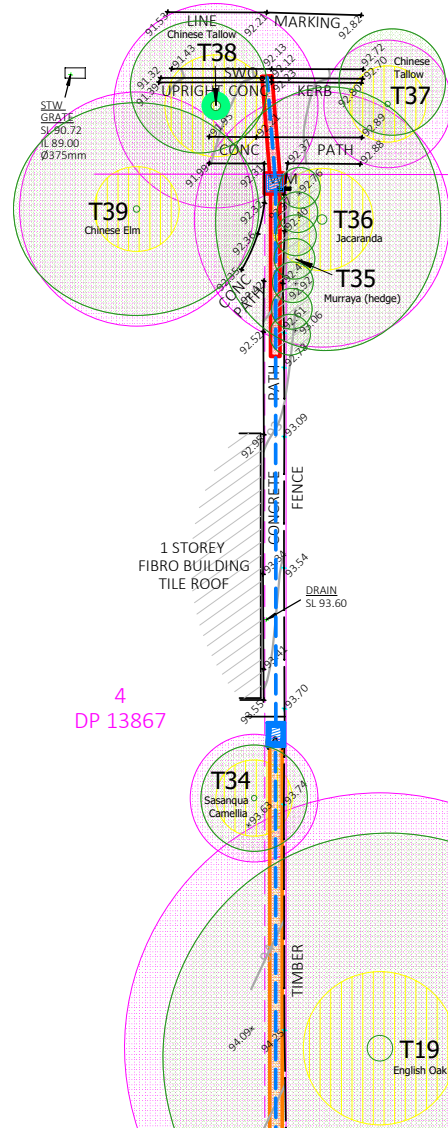
DWG No. T21-0916/02 [B]

SHEET 1

DATE: 05/11/2021

SOMERSET

STREET



APPENDIX 6 TREE PROTECTION PLAN

49A + 51 NORFOLK ROAD, EPPING, NSW



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SHEET 2

DATE: 05/11/2021