arboricultural impact assessment report

AIA-01
Revision B, Issued for Development Application
14 February 2023

PROJECT
18-22 Mundamatta Street
Villawood, NSW, 2163

CLIENT / PRINCIPAL
NSW Land & Housing Corporation
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i EXECUTIVE SUMMARY

On the 1 February 2022, Arterra was engaged by NSW Land and Housing Corporation (LAHC) (the Client) to undertake an arboricultural assessment of the site and prepare the relevant reports and plans to help guide the proposed multi dwelling residential development. The Client proposes to demolish two existing dwellings then construct two new buildings providing up to 12 new apartments with associated landscaping and services upgrades.

The works will involve the demolition of two existing buildings. The building to be demolished at No. 18 is very close to the most prominent, High Retention Value tree (**T08**) on the site. Great care will be required to retain and protect his tree through the demolition and construction process.

This assessment was restricted to **25 trees** within and immediately adjacent the site and likely to be impacted by the proposed works. It should be noted that physical access was only available to the properties and trees at 20 and 22 Mundamatta Street and the Council street trees in the roadside verge.

A detailed tree assessment and impact schedule was completed for all the existing trees close to the proposed works. (Refer to Appendix 4.2 – Tree Impact Assessment Schedule). The trees were photographed, allocated a unique identification number and plotted onto a scaled survey base plan for referencing and identification throughout the report and for future discussions and co-ordination with all Contractors and stakeholders (Refer to Appendix 4.1 – Tree Plans).

In summary, of the **25** trees assessed:

- **2** trees were rated as **High** retention value. Both are very large, visually significant trees that are easily viewed from the surrounding streets. Both are proposed to be retained and protected.
    - **T08** *Corymbia maculata* (Spotted Gum) growing on the boundary between 20 and 22 Mundamatta Street and close to a derelict building to be demolished.
    - **T11** *Corymbia citriodora* (Lemon Scented Gum) is growing in the neighbouring property adjacent to No.20, close to the eastern site boundary with much of its nominal Tree Protection Zone within the proposed work site.
- **7** trees were rated as **Moderate** retention value.
    - Only **2** of these, **T03** Callistemon salignus cv. (Weeping Bottlebrush) and **T10** *Jacaranda mimosifolia* (Jacaranda) are within the site.
    - The other **5** are adjacent the site. **4** are Council street trees (**T12-T15**) and **1** other, (**T20)** is located on a neighbouring property.
- **16** trees were rated as **Low or Nil** retention value, being small fruit trees, weeds and other invasive species.

21 trees are proposed to be removed to facilitate the development

- **16** are **Low or Nil** retention value being small fruit trees, weeds or in poor condition;
- **5** are **Moderate** retention value proposed for removal due impacts from the works.

4 trees are proposed to be retained and protected:

- **3** trees (T08, T11, T20) have **minor encroachments** of <10% as defined under AS 4970. These are discussed in Section 2.6.
- The **3** existing street trees fronting the property are to be removed and replaced as endorsed by Council (Refer email received from Canterbury Bankstown Council 9 February 2023).

Most importantly it will be vital to ensure the appointed Contractor ensures the required tree protection measures are put in place, are maintained, and that sufficient care is displayed by all sub-contractors during the construction.

This document has been prepared by Arterra, using the expertise of our in-house consulting arborist (AQF Level 5), Robert Smart. Robert is a member of the International Society of Arboriculture - Australian Chapter and is also a Registered Consulting Arborist with Arboriculture Australia.

Robert Smart AAILA , ISA, AA
Director, Registered Landscape Architect (054), Registered Consulting Arborist (1804)

1.0 INTRODUCTION

1.1 Background

On the 1 February 2022, Arterra was engaged by NSW Land and Housing Corporation (LAHC) (the Client) to undertake an arboricultural assessment of the site and prepare the relevant reports and plans to help guide the proposed multi dwelling residential development. The Client proposes to demolish two existing dwellings then construct new buildings providing new apartments with associated landscaping and services upgrades.

The works will involve the demolition of two existing buildings. The building to be demolished at No. 18 is very close to the most prominent, High Retention Value tree (**T08**) on the site. Great care will be required to retain and protect his tree through the demolition and construction process.

This assessment was restricted to **25 trees** within and immediately adjacent the site and likely to be impacted by the proposed works. It should be noted that physical access was only available to the properties and trees at 20 and 22 Mundamatta Street and the Council street trees in the roadside verge. No access was available to 18 Mundamatta Street, nor to the properties immediately surrounding to the site. As such, the tree data for 18 Mundamatta Street and surrounding properties are estimates based on observations made from within the accessible portions of the adjoining sites or from the publicly accessible streets and surrounds. Other trees surrounding the site, unlikely to be impacted, are not addressed as part of this report. The likely tree impacts and protection measures are discussed in more detail in **Section 2.6**.

Figure 1 – Aerial view of the site outlined in red. (Source: NearMap / Arterra)

1.2 Aims of This Report

The aim of this report is to assess the impact of the works on the existing trees within the site. Specifically, the report aims to:

- Provide clear recommendations as to which trees are to be retained and protected and those trees proposed to be removed to facilitate the project;
- Identify the proposed Tree Protection Zones (TPZ) of the trees being retained and identify and assess the likely arboricultural impacts of the development on the trees; and
- Provide advice on the tree protection measures that will be required during construction to ensure the trees are successfully retained.

The following limitations apply to this report's use: -

1. Plans: All plans are based on information provided to Arterra. They should only be used relating to tree issues and are not suitable for any other purpose.
2. Confidentiality: This report is confidential to the Client and should not be released to any Third Party without prior consultation with Arterra and consent from the Client.
3. Notification of proposed alterations to disturbance within TPAs: Arterra must be clearly notified of any proposed alterations to the plans or additional disturbance in the nominal TPZs, so that we can advise on the implications before any work is undertaken.

1.3 Relevant Controls or Legislation

The former **Bankstown City Council DCP 2015 – Part B11 2.3 Prescribed Trees** prescribes a tree for the purposes of Tree Protection as:

a) All trees that are 5.0 metres or more in height; and
b) All mangroves, regardless of size; and
c) All trees, regardless of size, listed as Vulnerable or Endangered or a component of an Endangered Ecological Community listed under the
d) Biodiversity Conservation Act 2016; and
e) All trees, regardless of size, listed under the Environmental Protection and Biodiversity Conservation Act 1999; and
f) All trees, regardless of size, located on lands included on the Terrestrial Biodiversity Map under Bankstown Local Environmental Plan 2015.

Section 2.4 Exemptions lists species that are Exempt from protection under Part B11 and provides details of other circumstances under which exemptions apply.

1.4 Conduct and Author Qualifications

Given the above stated aims of this report, as author of this report, Arterra Design confirms that Robert Smart is suitably qualified (AQF 5 Consulting Arborist) to provide comment and the required arboricultural advice pertaining to these matters.

Furthermore, Mr Smart confirms that he has read and agrees to be bound by the NSW Uniform Civil Procedure Rules 2005, Part 31 Division 2 Provisions, Schedule 7 - Expert witness code of conduct.

Arterra provides specialist consulting arborist services only and does not provide any physical tree work services such as climbing, pruning, removal, root investigations or root pruning. Our advice is based on impartial professional assessment only, as we do not derive any financial benefit from specifying pruning or other physical services. We will not specify any such activities unless we determine them to be essential to ongoing tree health or stability.

1.5 Documents Reviewed

Plans and documents referenced and reviewed as part of this tree assessment were:

- Bankstown City Council - LEP & DCP 2015 and Email received from Wayne Bromfield 9 February 2023

- Norton Survey Partners:
  - Details and Level Survey 4/12/21

- JN Engineers:
  - Site Plan -C010 Revision 5 (10/1122)
  - Ground Stormwater Plan -C200 Revision 5 (10/1122)
  - Typical Details -C050 Revision 5 (10/1122)

- Custance Architects - DA Package:
  - Site Plan - DA-0.20 Rev.8
  - Ground Floor Plan - DA-1.20 Rev.8 (7/11/22)
  - Level 1 Floor Plan - DA-1.20 Rev.7 (26/10/22)
  - Building Sections- DA-4.00 Rev 5 (26/10/22)

1.6 Site Location, History and Context

The site is located in Villawood in western Sydney, approximately 22km west of the Sydney CBD. Historic aerial images show the site and surrounds as predominantly cleared paddocks or farmland as late as 1951. The large trees (t08 and T11) appear to date from the late 1970s only.

Figure 2 – Aerial view showing the site in 1951. No trees are visible on the site. (Source: NSW Spatial Services / Arterra)

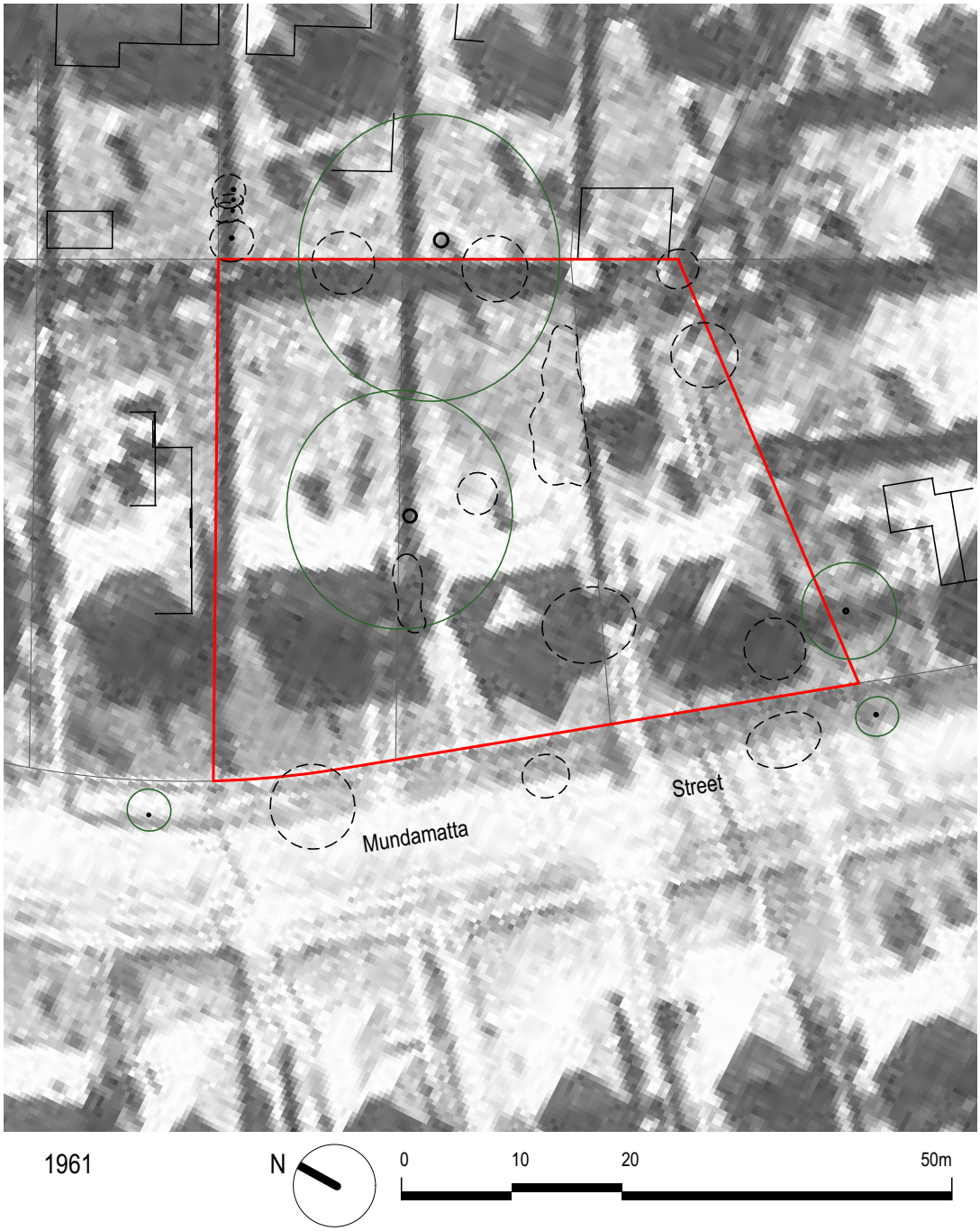


Figure 3 – Aerial view showing the site in 1961. Houses constructed but no trees are visible on the site. (Source: NSW Spatial Services / Arterra)

Figure 4 – Aerial view showing the site in 1970. No trees are visible on the site. (Source: NSW Spatial Services / Arterra)

Figure 5 – Aerial view showing the site in 1986. Some trees are now visible on the site with T08 and T11 evident as medium size specimens. (Source: NSW Spatial Services/ Arterra)

1.7 Site Ownership and Zoning

The site is owned by NSW LAHC and zoned R2-Low Density Residential under the Bankstown City LEP 2015.

1.8 Key Definitions and Abbreviations

The following abbreviations are used throughout this report.

"TPZ" = Tree Protect Zone

This is the area as defined by AS 4970 – "Protection of Trees on Development Sites" and means the typical minimum area above and below ground at a given distance from the trunk to provide for protection of the tree. Most importantly it represents the root zone required to be left undisturbed to maintain a healthy and viable tree. Please note, that roots will usually extend well beyond this zone, so this represents the minimum remaining root zone required, assuming all others are lost or damaged due to construction. It is typically calculated as a circle centred on the trunk unless existing site conditions can be assessed and indicate otherwise.

"TPA" = Tree Protection Area
Although based on the nominal TPZ above, this is a consolidated and often simplified area to be applied during construction for tree protection. This area is often shaped to deal with practical construction realities whilst maintaining appropriate protection of the nominal TPZ (i.e fencing a nominal circular TPZ can be difficult and impractical. TPA areas often define a square or rectangular shape which includes the area calculated as the nominal TPZ). It often amalgamates and simplifies tree protection zones, particularly when they are overlapping and can be amended for items such as buildings, walls, pathways and existing fences. It also protects areas that are contiguous to the calculated nominal TPZ, which are to be applied when the nominal TPZ is not completely circular due to structures potentially impeding root growth, or when there is an incursion calculated within the TPZ and compensatory areas are required.

"SRZ" = Structural Root Zone
This is the area as defined by AS 4970 – "Protection of Trees on Development Sites" and means the area immediately around the base of the tree at a given distance from the trunk within which the woody roots and soil cohesion are considered vital to the structural stability of the tree. Disturbance, damage or removal of soil and roots within this area will typically render the tree unstable and require its removal. It is typically calculated as a circle, centred on the trunk, unless existing site conditions can be assessed and indicate otherwise.

DBH = Diameter at Breast Height
This is the diameter of the trunk measured at 1.4m above ground level.

DGL = Diameter at Ground Level
This is the diameter of the trunk measured at ground level, but just above any root flare.

Non-Destructive Digging
This is the process of safely excavating the ground surface to minimise the risk of damage to existing tree roots. This method is used to map and locate existing tree roots within the TPZ and/or SRZ and helps to guide and inform the installation and/or construction of proposed services and/or structures which are in close proximity to retained trees. This is often achieved through hand digging using a shovel, trowel and/or fork with care not to damage the bark and wood of any roots. Compressed air (air spade) or water vacuum extraction are appropriate non-destructive alternatives to hand digging. When this work occurs within a TPZ and/or SRZ of a tree to be retained, a consulting arborist should always be present to monitor the works.

1.9 Assessment Methodology

On 1 February 2022, Robert Smart of Arterra completed a detailed assessment of the trees within the site. The trees' health and condition were assessed via a visual inspection from the ground only. Requisite tree data (including DBH, DGL, height & canopy spread, condition, proximity to services and other infrastructure) was recorded using an Apple iPad and Filemaker Pro database.

The basic health and condition criteria that were inspected for each tree can be summarised as follows: -

- Tree size, broad age class and general balance of the tree;
- Above ground obstructions;
- Evidence of recent site disturbance;
- Canopy foliage size, colour and density;
- Dieback and epicormic growth;
- Trunk or branch wounding, branch tear outs and pruning history;
- Structural defects such as any co-dominant stems, cracks, splits, included bark, decay; and
- Pests and disease evidence or occurrence.

The trees were photographed, identified, their details recorded and plotted onto a scaled base plan for referencing and identification throughout the report and for future discussions and co-ordination. (Refer Appendix 4.1). The photographic record of trees and general site context was taken using the inbuilt Apple iPad camera and a Panasonic Lumix TZ220 digital camera. Files have been resized, dated, named and filed in accordance with normal office procedures and protocols. No other image manipulation has been undertaken.

Tree trunk diameters were measured using a metric diameter tape measure. Tree heights were measured using the two-point clinometer function of a Nikon Forestry Pro laser range finder. Canopy spreads were estimated by pacing out distances along the cardinal axis of the canopy and cross referencing to survey information and aerial photos. Canopy position and extents were then altered on the plans to more accurately portray the canopy extent and position.

No specialised equipment or methods were employed to test for the extent of decay in any of the trees, apart from a nylon 'sounding' mallet. No plant samples were analysed or independently tested to verify or formally identify any pests or diseases.

Desktop Review and Research
Digital AutoCAD files of the survey, and layout of the proposed park embellishments were imported into Arterra's standard CAD software (ArchiCAD v24). Various area calculations and measurements were made in the CAD software to depict the tree TPZs and SRZs.

Recent aerial photography was obtained from the Nearmap website with aerial photos of the site dating from January 2021 imported into the above software for cross checking and assessment. (http://www.nearmap.com/ accessed 19/01/2022) Various historic aerial photography was also reviewed on the NSW Spatial Services website.

Climatic data was obtained from the Bureau of Meteorology using statistics from Bankstown Airport AWS which is approximately 2.5km to the south of the site. (http://www.bom.gov.au/climate/data/ accessed 07/02/2022)

1.10 Pre-Development Tree Assessment – Tree Retention Values

The information gathered in the field was tabulated and the retention values assessed using a combination of techniques commonly used and recognised in the arboricultural industry. The tree life expectancy was established using the Useful Life Expectance (ULE) system. A brief summary of these systems is described below.

ULE – USEFUL LIFE EXPECTANCY
This is a system developed by Jeremy Barrell in 1993 that determines the time a tree may be expected to be retained based on its age, health, condition, safety and location. This is then moderated by the economics of maintenance or other costs of retaining the tree. A long ULE means the tree is presently expected to live longer than 40 years with minimal intervention and cost. A short ULE indicates a tree that is not expected to live longer than 5 years or may require substantial intervention or costs to retain it.

RETENTION VALUES
The proposed retention value of the trees was determined based on a considered combination of the size, age, condition and suitability of the tree.

Each tree was then ranked according to one of 4 retention categories.

1. **"High" Retention Value** – these are trees that are typically in good or very good condition, large and visually prominent, historically or environmentally important. They should represent a serious physical constraint to the development and their removal avoided where possible and feasible.
2. **"Moderate" Retention Value** – these are trees that are in good to reasonable condition and should be retained where possible and feasible to do so.
3. **"Low" Retention Value** – these are trees that are of poor condition or have structural defects, are particularly small or common place, are not historically, environmentally or socially significant and should not be considered as a constraint to the development. They could be retained only if they are not likely to be impacted by or constrain potential desirable development outcomes.
4. **"Should Remove" / No Retention Value** – these are trees that are in very poor health, or poor form, or have serious structural defects, are considered weeds or combination of all these, and therefore should be considered for removal regardless of any development.

Consideration has also been given to the relationship of the trees to one another and their proximity to the likely development areas on the site. For example, trees that are part of a closely spaced group, or are likely to be significantly misshapen or unstable with the removal of surrounding trees and structures are considered with these factors in mind.

1.11 Tree Assessment and Tree Protection Zones Generally

In order to ensure the long-term survival and growth of any tree to be retained on the development site, a suitable area is required to be protected around the tree. This area should typically be as large as possible. It should also take into consideration: -

- The size and age of the tree;
- Above and below ground properties;
- The health and condition of the tree;
- The species of tree and its tolerance to disturbance;
- Soil conditions, type, depth and site hydrology and
- Site specific conditions and any existing obstructions to root development.

The Tree Protection Zones (TPZs) have been calculated using the formula and criteria outlined in AS 4970-2009 Protection of Trees on Development Sites. In summary the standard applies the calculation for the radius of the TPZ as 12 x (the tree trunk diameter (in metres) calculated at breast height (DBH)). DBH is taken at 1.4m above ground level.

A maximum TPZ radius will be 15m (unless crown protection is required) while the minimum TPZ radius shall be 2m.

The TPZ is typically assumed to be radial and centred on the centre of the trees trunk unless other site factors or tree canopy size and location dictate an adjustment. Encroachments of up to 10% of the area may be accepted within the TPZ as long as it is outside of the Structural Root Zone (SRZ). This is known as a "minor encroachment". Encroachments greater than this, known as "major encroachments" will only be accepted with additional specific evidence that the tree will not be unduly impacted.

Whenever an encroachment is made into a TPZ, a suitable compensation should be made elsewhere and physically contiguous to the remaining TPZ.

The Structural Root Zone (SRZ) is the area defined as the minimum area required to retain the structural stability of the tree. The formula for calculating the SRZ is outlined in AS 4970 Section 3.3.5. No encroachment into the SRZ shall typically be allowed.

2.0 KEY OBSERVATIONS & DISCUSSION

2.1 The Proposed Development

The proposed project will result in some significant site disturbances in the vicinity of the trees. There may be a range of impacts on the trees immediately adjacent the proposed works. Specifically, the proposed development will involve:-

- Demolition of existing structures;
- Use of civil and earthmoving equipment;
- Access to and from the site for trucks and construction plant;
- Excavations and trenching;
- Stockpiles of excavated material and demolition waste;
- Stockpiles/ storage of materials;
- Re-grading and filling of the surface levels;
- Trenching for services and footings;
- General civil and landscape works involving paving, concreting and general construction;
- Landscaping.

Key Assumptions:-

1. All excavations and demolition work within the defined TPAs shall be done using hand tools and or other non-destructive methods only and only under the oversight of an appropriately qualified consulting arborist. Roots of 50mm diameter or greater are not to be cut or damaged unless specifically approved by the supervising consulting arborist.
2. Pedestrian paths, terraces and landscaping within the TPA shall be constructed at or above the existing surface levels to minimise surface root impacts.
3. All construction access and deliveries are to be made directly from Mundamatta Street using existing hardstand areas and pathways. Concrete will typically be pumped, and the delivery of other materials will not require trafficking through any tree protection areas.
4. Where no spot levels are indicated it is assumed that the existing surface levels are retained.
5. It is assumed that any new landscape grading within the nominated tree protection areas will be minimal and installed using high quality, imported manufactured topsoil. No cultivation of the existing soils shall be undertaken within the defined TPA.

2.2 Climate and Microclimate

Villawood is in Western Sydney approximately 21 km west of the CBD and 17km inland from the coast. The general climate of the region may be described as experiencing moderate temperatures, good rainfall and minimal climatic and weather extremes. It is typically described as a temperate climate with hot to warm summers and cool winters, with relatively uniform rainfalls greater than 800mm / year. There is no distinct dry season.

It has an approximate average annual rainfall of 870mm, fairly evenly spread across the year but with a slightly drier period during the late winter and early spring months. The highest rainfall period is usually February with an average of 107mm and the driest month being July with an average of less than 44mm.

Maximum average daily temperatures range from 28.5ºC in January and to 17.4 in July. The minimum average daily temperatures range from a high of 18.3ºC in January down to lows of 5.2ºC in July.

The primary wind direction is from the south east to the east in the afternoons while it is predominantly from the west and north west in the mornings. This is common of coastal areas dominated by "sea breeze" affects. Review of climate data indicates that the primary direction for strong winds (>40km/h) is from the west in the afternoons. The appear to be no significant microclimatic influences on the site.

2.3 Soils and Landform

Soil mapping indicates the site to be within the Blacktown Soil Landscape Association which occurs extensively throughout much of western Sydney. These soils are often related to the remnants of highly weathered shales of the Wianamatta Group. This is typically characterised by undulating low and rolling hills located over the Ashfield and Bringelly Shale geological formations which are mostly interbedded shales with very occasional sandstones. Typically these areas would be shallow to moderately deep Red Podzolic soils, where the boundary between the topsoil and subsoil is relatively clear. These shale based soils are generally of low fertility with good water holding capacity. They are therefore also subject to waterlogging and are often acidic.

A representative soil sample was taken in the centre of the site near the large, important, High retention value T08. The results from the sample taken were very reflective of the naturally occurring soils and indicated a red podzolic soil. From the topsoil sample taken at 150-200mm depth, the soil structure was moderately pedal with

fine to medium sub angular blocky peds. The soil texture was a clay with the colour being mid brown. The soil pH was moderately acidic with a pH of 5.5-6.0. There was a distinct change from the A to B horizons at around 400mm depth. The subsoil from a depth of 600-700mm was sampled. The subsoil structure was very strongly pedal with coarse blocky peds. The soil texture was a heavy clay. Its colour was an orange grey . The soil pH was acidic at 5.0 - 5.5.

Figure 6 – Photo of soil sample take in the middle of the site near Tree T08. (Photo: Arterra)

The soil would typically have good water holding capacity but may be subject to waterlogging, particularly in flatter areas and depressions. It would have good cation exchange capacity (CEC) and although naturally low fertility, it would have good nutrient holding capacity if fertilisers were applied. The high clay contents of both the topsoil and subsoils however make the soils highly subject to compaction, if trafficked when wet, and would then set hard when dry, often leading to great difficulty in then absorbing surface water and reduced soil oxygenation.

The natural vegetation that once characterised the area and the Blacktown Soil Landscape Association has now been extensively cleared in the local area, but it would have been open woodland (dry sclerophyll forest) and been dominated by the following representative species.

- *Eucalyptus tereticornis* (Forest Red Gum)
- *Eucalyptus crebra* (Narrow-leaved Ironbark)
- *Eucalyptus fibrosa* (Broad-leaved Ironbark)
- *Eucalyptus sideroxylon* (Mugga Ironbark)
- *Eucalyptus moluccana* (Grey Box)
- *Corymbia maculata* (Spotted Gum)
- *Angophora floribunda* (Rough-barked Apple)
- *Eucalyptus globoidea* (White Stringybark)

2.4 Tree Assessment – Species and Condition Generally

A total of **25** trees were assessed for this report. Most are exempt species under the DCP being fruit trees, weeds and other invasive species. Detailed information on each tree including; height, trunk diameter, canopy spread, age class and condition are all provided in Appendix 4.2 'Tree Impact Assessment Schedule'.

Of the **25** trees assessed:

- **2** were rated as **High** retention value. Both are very large, visually significant trees that are easily viewed from the surrounding streets.
    - **T08** *Corymbia maculata* (Spotted Gum) growing on the boundary of 20-22 Mundamatta Street and close to the derelict building to be demolished.
    - **T11** *Corymbia citriodora* (Lemon Scented Gum) growing in the property adjacent to No.20, close to the eastern site boundary.

- **7** trees were rated as **Moderate** retention value.
    - Only **2** of these, **T03** Callistemon salignus cv. (Weeping Bottlebrush) and **T10** *Jacaranda mimosifolia* (Jacaranda) are within the site.
    - The other **5** are adjacent the site. **4** are Council street trees (**T12-T15**) and **1** other, (**T20)** is located on a neighbouring property.
- **16** trees were rated as **Low or Nil** retention value, being small fruit trees, weeds and other invasive species.

Figure 7 – T08 – Corymbia maculata (Spotted Gum) High retention value, visually prominent from outside the site. This tree is an excellent tree in good condition and is to be retained and protected. (Photo: Arterra 01.02.2022)

Figure 8 – T11 – Corymbia citriodora (Lemon Scented Gum) High retention value tree, growing adjacent to site. Visually prominent from surrounding streets and residences. This tree is to be retained and protected. (Photo: Arterra 01.02.2022)

Figure 9 –Typical condition of the small Council street trees adjacent the site. (Photo: Arterra 01.02.2022)

Figure 10 –T03 Callistemon salignus cv. (Weeping Bottlebrush) viewed from Mundamatta Street. This tree is within the works footprint and will require removal. (Photo: Arterra 01.02.2022)

Figure 11 –Photos of small neighbouring property trees that require removal to facilitate the construction of the stormwater connection from the site to Lowanna St. (Photo: Arterra 01.02.2022)

2.5 Tree Biology and Tree Care Basics

Trees are dynamic living organisms. Trees can be very susceptible to damage, stress and declining rapidly if overly impacted by construction. Trees take decades to grow but can be injured and killed in a very short time frame. This is particularly due to the irreparable damage to the often shallow, extensive and unseen root systems. It is rarely possible to repair a stressed or damaged tree, after the damage has occurred. Proper protection is the key to minimising construction related impacts. Severing of roots within the Structural Root Zone (SRZ) can also lead to potentially unsafe instability of the tree as a structure.

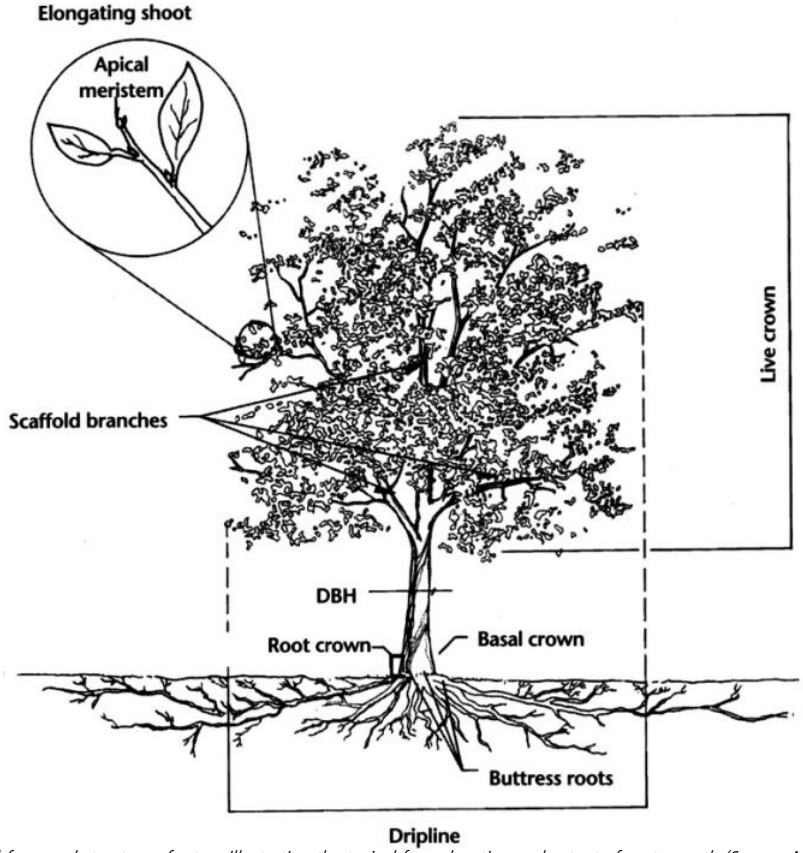


Figure 12 – Typical form and structure of a tree illustrating the typical form, location and extent of root growth (Source: Matheny and Clark, 1998)

Basic Tree Needs

As a living organism a tree remains alive by completing the following chemical reaction -
Carbon Dioxide and water in combination with chlorophyll and light is converted to Glucose and Oxygen [CO_2 + H_2O + light = sugar (CH_2O [Glucose]) + O_2]

The process ultimately leads to the plant cells 'respiring' and producing energy for survival, a natural requirement for all living cells. Anything that affects a plant's photosynthesis and then cellular respiration will affect the overall plant health. The limiting factors of photosynthesis and respiration will typically be the availability of oxygen, water and nutrients that make up the important chemical molecules and reactions.

Trees therefore have five basic requirements to survive and successfully grow:-

1. Oxygen (and particularly oxygen within the soil);
2. Water (a cellular necessity and primarily taken up by the tree roots);
3. Light & Sufficient Foliage (in order to photosynthesise and create the resources needed for cellular survival);
4. Soil (for physical anchorage and critical chemical nutrients) and
5. Physical Space (both above and below ground to grow).

Importantly, a minimum of 15% soil oxygen is required for active root growth and nutrient uptake. Less than 10% available soil oxygen starts to restrict root extension and growth and a minimum of 3% soil oxygen is required to just maintain root existence. Less than this will result in root death (Harris 1999).

One of the most insidious effects of construction on trees is often that of soil compaction or covering of root zones with impervious surfaces, as it:-

- Reduces infiltration rates of surface water;
- Reduces the availability of water to the roots as they can't naturally extract remaining moisture when soil becomes too dry;
- Reduces air to roots (roots cease to function properly and die without oxygen);
- Increased soil strength caused by compaction mean that roots need more energy to growth through it or can't even physically penetrate the soil;
- Roots are physically broken or crushed and there is increased potential for fungal and pathogen attack. (Harris 1999).

Tree Tolerance
Typically, older and larger trees are less tolerant of construction impacts. Different species also have different tolerance of injury and disturbance. Importantly it needs to be stressed, that a tree does not "heal" from injury as animals do. Typically, any injury made to a tree results in the tree expending considerable energy reserves to create new growth that "seals" and surrounds a wound and then attempting to compensate structurally and physically for any losses. Impacts to trees are therefore cumulative and a series of otherwise small and unrelated impacts can easily result in the death of a tree.

A tree that is already compromised or showing signs of stress is far less likely to tolerate construction impacts due to its lower levels of energy reserves and already weakened state. Therefore, a tree that is only in a fair condition or poor condition is less likely to tolerate construction impacts than a young tree in good or excellent condition. Weakened or stressed trees are also far less able to combat the myriad of normal environmental stresses and pathogens that are naturally imposed against them such as drought, decay, fungi, bacteria and insect pests.

2.6 Tree Impact Assessment

The intention of this assessment is to clearly illustrate the trees to be retained as part of the development. It is also to determine any incursions into the retained trees' root zones and canopies by the proposed development and evaluate the likely impact of the proposed works on the trees. A detailed list of the incursions and likely impacts of the proposed development on each tree is shown in Appendix 4.2 – Tree Impact Assessment Schedule.

Having reviewed of the proposed works, we understand the two **(2)** significant High Retention Value trees will be retained and protected. Two (**2**) Moderate Retention Value trees are proposed to be retained and protected adjacent to the south western corner of the site (**T20 & T15**). The remaining **21** trees are recommended for removal to allow the works to be completed as detailed. The **3** street trees on the street frontage (**T12,T13, & T14**) are to be removed and replaced with 6 new equally spaced street trees as endorsed and recommended by Council. (Refer to email received from Wayne Bromfield - Canterbury Bankstown Council – received 9 February 2023)

Of the **4** trees to be retained and protected:

- **3** trees (**T08, T11, T20**) each have a **minor encroachment** <10% as defined under AS 4970.

The remaining **21** trees are recommended for removal to allow the works to be completed as detailed.

The minor encroachments and potential mitigating actions are discussed below and shown graphically in 4.1 – Tree Plans.

T08 *Corymbia maculata* (Spotted Gum) – Minor Incursion
The works proposed to be undertaken around this tree involve the removal of the existing concrete pavement around the base, demolition of the adjacent building and construction of a new building slab in the western most portion of the trees nominal TPZ. The construction will result in a minor incursion of approximately 10%. To further appropriately retain and protect this tree, the new slabs and excavation for the proposed new building have been set so as to avoid excavation below 200mm from existing ground levels. It is assumed that any roots below this level can then also be successfully retained and protected.

The proposed terraces and other pathways and landscape around this tree have been designed to be at or above existing levels and it is expected that the impacts will be surface impacts only, with minimal root loss expected. The paving for the building terraces will be supported on isolated piles where required to limit the need for unnecessary compaction and excavations within the TPA. This is considered acceptable and it is the author's opinion that this tree can be successfully retained and protected.

Any service installation through the consolidated TPA shall be done by hand or other non-destructive method as agreed with and under the direct supervision of the project consulting arborist. Minor surface impacts are to be carefully managed and minimised where possible.

The area around the tree, and T11, is to be mulched with 100m of mulch to limit any construction period disturbance to soils and improve general soil conditions. A temporary irrigation system is to be employed to maintain tree health and soil moisture levels during construction.

T11 *Corymbia citriodora* (Lemon Scented Gum) – Minor Incursion
This tree is in an adjacent property, close to the eastern site boundary. It has a DBH in excess of 1.2m and the nominal TPZ extends well within the site. The building construction work and a crossing for stormwater infrastructure to the western portion of the TPZ creates a minor incursion of approximately 7% in the western portion of the nominal TPZ. This is considered acceptable.

Excavations to achieve the required carpark levels may result in some very minor root impacts although proposed finished levels have been adjusted to minimise likely root impacts. Minor surface impacts are to be carefully managed and minimised where possible.

T20 *Jacaranda mimosifolia* (Jacaranda) – Minor Incursion
This tree is in an adjacent property, close to the southwestern corner site boundary. It has a DBH of 0.35m and the nominal TPZ extends marginally within the site. The re-grading and construction of the proposed new driveway creates a minor incursion of approximately 9% in the northern portion of the nominal TPZ. Excavations to achieve the required driveway levels may result in some minor root impacts. This has been limited and is deemed acceptable and the tree should suffer only minor impacts.

In the author's opinion, the minor encroachments detailed above are considered acceptable and unlikely to result in any significant, detrimental impacts to the condition and long term viability of the retained trees.

2.7 Potential Tree Related Impacts to be Managed During Construction

The main potential tree related impacts from the proposed construction activity can be summarised as tree damage and 'reduced life expectancy' caused by:

- Unnecessary root loss and disturbance due to demolition and excavation for the construction of new building slabs, carparks and driveways;
- Compaction, crushing, scalping or disturbance of the surface roots and soils of the tree root zones from careless excavations, trafficking, or placement, storage and stockpiling of materials;
- Contamination of the soils from the preparation of chemicals, wash down and cleaning of equipment, refuelling of vehicles/ machinery or dumping of waste;
- Compaction of the tree root zones from general trafficking and the parking of vehicles/ plant equipment;
- Root disturbance from any undocumented or careless trenching, cut and fill and soil level changes;
- Physical damage to the tree trunks and canopy from passing construction machinery or delivery vehicles;
- Damage to the tree roots from final landscaping and construction works.

The following section provides the key recommendations and proposed tree protection measures that aim to minimise and avoid these impacts as much as realistically possible.

3.0 TREE MANAGEMENT RECOMMENDATIONS

3.1 Amendments Made to Initial Designs

Recommendations were made by Arterra, during site planning, suggesting adjustments be made to the site plan and subsequent minor adjustments to the new building slab and carpark levels and the alignment of the new southern driveway. These recommendations were specifically aimed at minimising the potential construction related impacts to the surface roots associated with the trees proposed and identified to be retained. The design changes have been incorporated within the documentation package submitted for approval. This has been the basis of the impact assessment. No further changes to the design to allow tree retention are currently proposed.

3.2 Key Recommendations to Reduce Tree Impacts

The following recommendations are made to reduce the negative construction impacts on the existing trees to be retained and should be conditioned by Council or this report cited in the consent conditions.

- Due to the location of the retained trees and their proximity to the proposed works, by necessity, work is still occurring within the nominal tree protection zones. All work close to the trees will need to be undertaken with great care to minimise the tree impacts. Excavations below existing levels shall be limited to a maximum of 200mm below existing levels.
- Consulting Arborist to be present during demolition of existing cottage near T08 to ensure tree protection.
- Install appropriate tree protection for the duration of all major site construction work. See Appendix 4.1 T-03 'Tree Protection and Removal Plan' for types and locations. This will include a combination of trunk protection battens to **T08**, installation of temporary mulching, irrigation and protective fencing and water filled barricades around the street tree to minimise the potential for accidental damage. Consulting Arborist to certify protection measures have been appropriately installed before main works commence.
- Carefully control and fence or otherwise barricade the primary access routes to and from the construction area so that unexpected movement of vehicles does not occur through any identified TPA and all retained trees are carefully considered and protected during vehicle movements and deliveries. Utilise wherever possible existing hardstand areas for vehicle access to avoid compaction of soils around the trees. Note, some small areas will be outside of the temporary fencing but will still be within the designated TPA. Contractor shall still ensure that works in these areas are undertaken with due car for subsurface conditions and tree root protection.
- Ensure all the above and below ground services that are proposed to be installed are excluded from running through any TPAs (beyond the already noted incursions).
- If roots greater than 50mm Ø, are encountered in the course of any works, work in that area shall cease immediately and the project consulting arborist shall be contacted to review and advise how best to minimise tree impacts prior to works re-commencing.
- All new pathways within the consolidated TPA shall typically be installed at, or slightly above, the pre-existing ground levels to minimise construction impacts on surface-oriented roots. Roots that are under 50mm Ø, if exposed, may be cleanly cut if encountered and unable to be reasonably worked around.
- Minimise and avoid the use of slab edge set downs when designing any pavements around the retained trees.
- During finalisation of the works, minimise the re-grading of the ground surfaces within the consolidated TPAs to meet and match proposed pathways and entry levels. Where regrading is required, limit it to a maximum of 400mm above existing ground levels and ensure it is only quality sandy manufactured organic garden mix.
- Do not allow storage or stockpiling of any materials or site sheds within TPAs unless it can be demonstrated that this will not impact on the tree retention and is approved in writing by the Project Consulting Arborist.

3.3 Proposed Tree Protection & Construction Activity Sequencing

The following sequence of activities should be followed for this project: -

1. The Tree Protection Plan to be issued as part of the construction contract and prior to any construction work.
2. Project Consulting Arborist, Landscape Architect, Civil and Structural Engineers, Client and Contractor Site Foreman are to meet prior to beginning any work on the site to discuss and review all work procedures, construction access routes, stockpiling and tree protection measures (ie: fence types and locations, access, general construction methods etc.).
3. Contractor to discuss the locations and type of any sediment and erosion controls (if any) and install them with minimal tree impact when they are within or passing through the tree protection areas.
4. Trunk protection shall be placed on the nominated trees.
5. Existing cottage to be demolished. Existing pathways, paving and buildings are to be carefully removed from within the tree protection areas, where required (Consulting arborist (AQF 5) to be present during these works).
6. Trees identified for removal are removed.

7. The Construction Phase tree protection areas and work zone are to be defined and fenced off with a 1.8m high metal or plywood temporary fence prior to any further work within the vicinity of the trees. Water filled barricades are to be placed adjacent remaining Mundamatta Street tree to be retained and protected.
8. The primary centralised TPA is to be applied with temporary mulch and supplied with temporary irrigation.
9. Any required rumble boards are to be installed to protect the ground surface in tree protection areas, if any access is required by the Contractor through a TPA.
10. Main building and civil works to be completed.
11. Contractor to remove the tree protection fencing and other protection measures and then install any final landscaping treatments within the tree protection areas and under the trees, but only after main construction is completed.

3.4 Demolition Work Near Trees or within defined Tree Protection Areas

Demolition of paths and other structures required within the defined tree protection area may be done with very small tracked equipment (employing a spotter) or by hand, with care to limit damage and disturbance of the root zone. All such work within tree protection areas shall be supervised and overseen by a qualified Project Consulting Arborist. Wherever possible equipment to be parked outside tree protection areas to perform the work.

3.5 Ground Protection within Defined Tree Protection Areas

Vehicular movement and access shall typically not be required or approved through the tree protection areas unless it is already a paved hardstand area. If it is absolutely necessary and it is proposed to create any access path, or similar, within the defined tree protection areas, the Contractor shall install rumble strips / boards over the ground surface. No excavation shall be allowed. Contractor shall first place a suitable permeable geotextile to the extent required and then a 100mm thick layer of wood chip mulch or coarse no-fines gravel over the extent to be covered with the rumble strip / boards. Then place hardwood boards (minimum 3600 x 200 x 75mm) on their flat edge, side by side, with a 30 - 50mm gap to form a rumble strip. These boards are to be held together with three galvanised metal bracing straps nailed to each board. The two outer straps are to be approximately 200mm in from the ends of the boards. The third strap is to be along the centre line of the boards.

Figure 13 – Example of acceptable Tree Protection Area ground protection

3.6 Trunk and Lower Branch Protection

A trunk barrier is to be erected around the circumference of the tree trunk and trunk flare and root buttress. This barrier will consist of a double layer of suitable 'used' artificial grass matting, carpet or carpet underfelt placed around the trunk. A layer of battens is to be placed over the underfelt. The battens are to have a maximum spacing of 50-100mm. The height of the battens is to be 2 metres or to the height of the first branches. Lower large branches may require the same protection if they are likely to be damaged by passing vehicles or equipment. Secure in place with galvanised steel bracing straps. Do not nail into or otherwise injure the trunk or bark. Battens may be made from any suitable waste timber of similar sizes and depths. All sharp or protruding edges are to be properly covered with tape or similar padding.

Figure 14 – Example of acceptable Trunk Protection batten installation. (Image: Arterra)

3.7 Provision of Temporary Irrigation

A temporary and automated (battery powered timer is sufficient) watering system may be placed within the TPAs of **T08** and **T11** to maintain adequate water to the retained trees and help maintain their healthy condition. This can be a surface mounted 'residential-style' soaker hose and/or surface sprinkler systems. It is to be surface visible and spray delivered so that its operation can be easily visible and verified. It should be on a designated supply line, separate from other construction related water supplies to minimise its likelihood of being disconnected.

Typically, during spring and summer months it should be set to run for a minimum of 20 minutes every day, in the early morning. During, autumn and winter months it should be set to run for 1 hour once every week. The operation can be suspended temporarily in periods of extensive and prolonged rain.

The system is to remain in place for the duration of construction, or until the project consulting arborist approves its removal. It may be removed to allow final landscape treatments to proceed. If accidentally disturbed or damaged by construction activities, it is to be reinstated as soon as practicable.

3.8 Final Landscaping within TPAs

Once final levels are set by the finished structural elements. The final trimming and landscaping shall be judiciously undertaken. The final pedestrian pavements shall be installed without undue excavation or compaction to the soil and all soft landscaping within the tree protection zone will be installed with care to avoid root disturbance via irrigation trenching, lighting installation and the planting of larger plants. The installation of 100-200mm of new garden mix topsoil over the pre-existing soil will provide a suitable medium in which to plant new plants without damage to existing tree roots. Permanent irrigation (if used) shall be installed as spray heads located outside of TPZs and spraying inwards. All other services such as electrical services shall also be designed and installed to avoid any excavation or trenching around the trees.

3.9 Final Pedestrian or Building Clearance Pruning

Once the final levels and finishes are in place the Project Consulting Arborist shall supervise the selective pruning of any lower peripheral branches to the retained trees to achieve required clearances for final pedestrian access or buildings or the like. At this stage no such pruning is anticipated. The branches of any tree shall only be pruned as specifically needed and directed by the Project Consulting Arborist. Work is to be in strictly accordance with

AS4373 - Pruning of Amenity Trees. Do not treat wounds. Only clean, sharp pruning implements shall be used for all pruning work, ensuring that cuts are made without damage, tearing or bruising of the vascular tissue.

3.10 Other Tree Protection Measures to be Implemented

The following is a summary of the other measures that will be required during construction. These should be adopted for the Construction Contract and conditioned by Council.

Controlled Construction Access & Parking

Construction access points and stockpiling and storage areas shall be clearly identified and fenced where appropriate. Uncontrolled access points and parking of vehicles outside of designated areas is to be avoided. If temporary access is required through a tree protection zone, ground protection shall be employed to limit soil compaction and root damage and disturbance.

Communication - Tool Box Meetings and Construction Inductions

All contractors and their subcontractors shall be inducted prior to working on the site. All inductions shall include description and identification of the Tree Protection Areas and the restriction on work and activities with regard to trees. The site foreman shall ensure that all new staff and contractors are appropriately inducted and that brief "tool box" meetings are conducted regularly to ensure Tree Protection is maintained at the forefront of all construction workers minds.

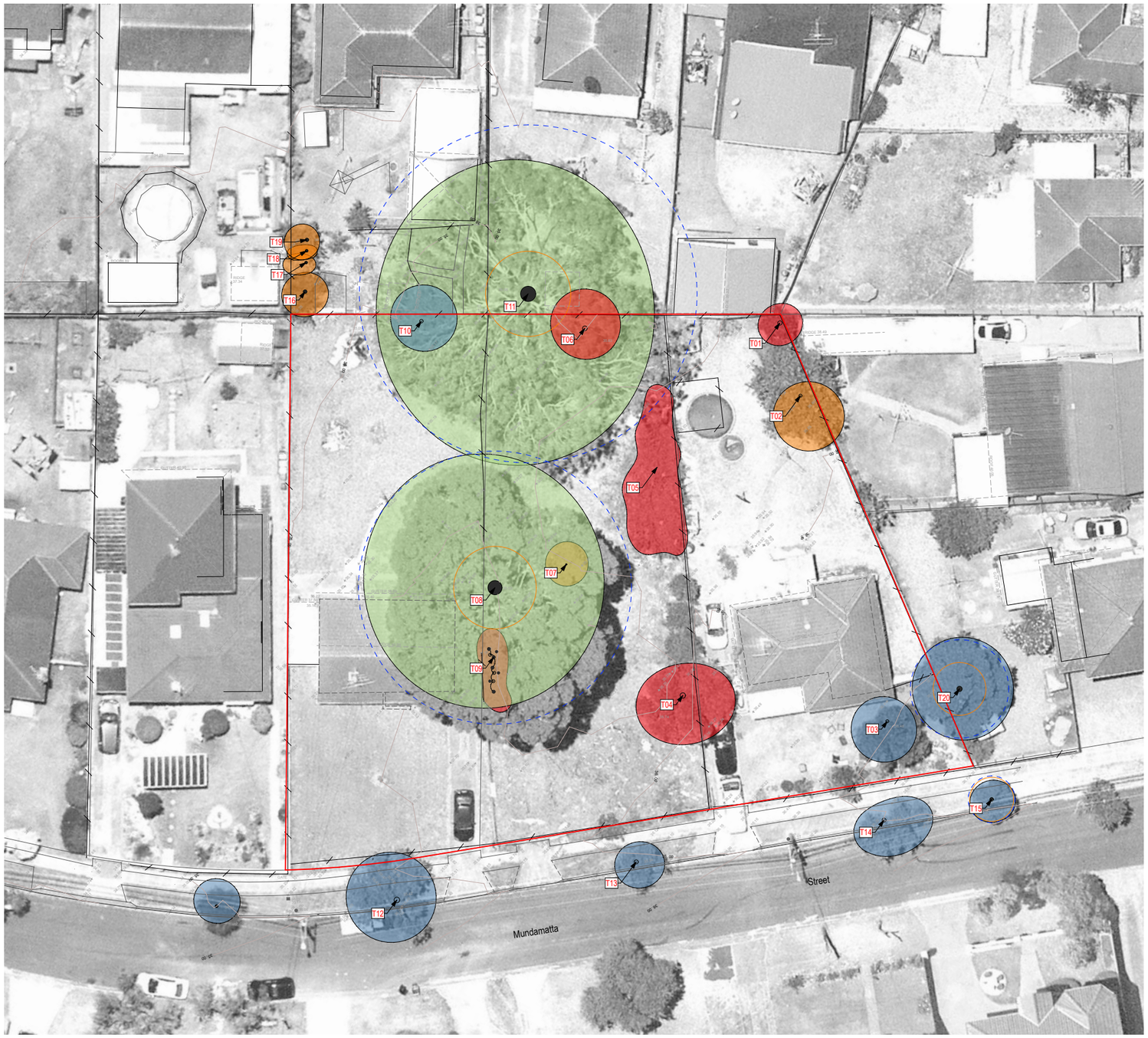
3.11 References

- Chapman, G.A and Murphy, C.L 1989, *Soil landscapes of the Sydney 1:100 000 Sheet Report*, Soil Conservation Service of NSW, Sydney, NSW.
- Harris, R.W, Clark, J.R & Matheny, Nelda P, 1999*, Arboriculture: Integrated management of landscape trees, shrubs and vines*. 3rd Ed. Prentice Hall. New Jersey, US
- Matheny, Nelda P and Clark J.R, 1998, *Trees and development - a technical guide to preservation of trees during land development*, International Society of Arboriculture, Illinois, US.
- Roberts, J. Jackson, N. and Smith, M. 2006. *Tree roots in the built environment. No.8* Research for Amenity Trees, Dept. for Communities and Local Government, London.
- Standards Australia, 2007, *AS 4373-2007 Pruning of amenity trees*. Standards Australia, Sydney.
- Standards Australia, 2009, *AS 4970-2009 Protection of Trees on Development Sites*. Standards Australia, Sydney.
- Standards Australia, 2007, AS 4687-2007 Temporary fencing and hoardings. Standards Australia, Sydney.

- End of report.

4.0 APPENDICES

4.1 Tree Plans



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LAHC - 18-22 Mundammatta Street, Villawood - Tree Assessment Schedule

Tree ID	Trees in Group	Tree Species	Common Name	Trunk Diameter Breast Height (dbh) (m)	Trunk Diameter at base (dgl) (m)	Nominal TPZ radius (m) 12xdbh (AS 4970)	Nominal SRZ radius (m) (AS 4970)	Retention Value	Recommendation
1	1	*Ligustrum lucidum*	**Broadleaf Privet**	0.30	0.35	3.60	2.13	**Nil / Remove**	Remove
2	1	*Morus nigra*	**Mulberry**	0.22	0.25	2.64	1.85	**Low**	Remove
3	1	*Callistemon salignus cv.*	**Willow Bottlebrush**	0.20	0.25	2.40	1.85	**Moderate**	Remove
4	1	*Ligustrum lucidum*	**Broadleaf Privet**	0.40	0.45	4.80	2.37	**Nil / Remove**	Remove
5	1	*Cestrum parqui*	**Green Cestrum**	0.10	0.15	2.00	1.49	**Nil / Remove**	Remove
6	1	*Ligustrum lucidum*	**Broadleaf Privet**	0.35	0.40	4.20	2.25	**Nil / Remove**	Remove
7	1	*Acacia longifolia*	**Golden Wattle**	0.08	0.11	2.00	1.31	**Low**	Remove
8	1	*Corymbia maculata*	**Spotted Gum**	0.97	1.16	11.64	3.52	**High**	Retain
9	6	*Cinnamomum camphora*	**Camphor Laurel**	0.15	0.25	2.00	1.85	**Nil / Remove**	Remove
10	1	*Jacaranda mimosifolia*	**Jacaranda**	0.27	0.30	3.24	2.00	**Moderate**	Remove
11	1	*Corymbia citriodora*	**Lemon Scented Gum**	1.20	1.25	14.40	3.63	**High**	Retain
12	1	*Callistemon viminalis cv.*	**Weeping Bottlebrush**	0.40	0.47	4.80	2.41	**Moderate**	Remove
13	1	*Callistemon viminalis cv.*	**Weeping Bottlebrush**	0.23	0.34	2.76	2.10	**Moderate**	Remove
14	1	*Callistemon viminalis cv.*	**Weeping Bottlebrush**	0.27	0.33	3.24	2.08	**Moderate**	Remove
15	1	*Tristaniopsis laurina*	**Water Gum**	0.15	0.26	2.00	1.88	**Moderate**	Retain
16	1	*Prunus x blireana*	**Flowering Plum**	0.18	0.25	2.16	1.85	**Low**	Remove
17	1	*Punica granatum*	**Pomegranate**	0.10	0.18	2.00	1.61	**Low**	Remove
18	1	*Punica granatum*	**Pomegranate**	0.10	0.18	2.00	1.61	**Low**	Remove
19	1	*Prunus sp.*	**Plum**	0.18	0.24	2.16	1.82	**Low**	Remove
20	1	*Jacaranda mimosifolia*	**Jacaranda**	0.35	0.40	4.20	2.25	**Moderate**	Retain

NOTE
Refer to the accompanying Arboricultural Impact Assessment Report for full description of trees, measurements and methods used to assess the trees, and proposed tree protection measures.

Tree Retention Value Legend

- High Retention value
- Moderate Retention value
- Low Retention value (Note: no TPZ's shown for these trees)
- Nil Retention value (should remove) (Note : no TPZ's shown for these trees)
- Nominal Tree Protection Zone (TPZ)
- Nominal Structural Root Zone (SRZ)
- Extent of canopy as verified by site measure and aerial photos
- T26 Tree Identification Number

TREE RETENTION VALUE NOTES

The proposed retention value of the trees was determined based on a considered combination of the size, age, condition and suitability of the tree. Each tree was then ranked according to one of 4 retention categories;

1. **"High" Retention Value** — these are trees that are typically in good or very good condition, large and visually prominent, historically or environmentally important. They should represent a serious physical constraint to development and their removal avoided where possible and feasible.
2. **"Moderate" Retention Value** — these are trees that are in good to reasonable condition, with no major structural defects and could be retained where possible and feasible to do so.
3. **"Low" Retention Value** — these are trees that are of poor condition or have structural defects, are particularly small or common place, are not historically, environmentally or socially significant and should not be considered as a constraint to development. They could be retained only if they are not likely to be impacted by or constrain potentially desirable development outcomes.
4. **"Nil" Retention Value** — these are trees that are in very poor health, or poor form, or have serious structural defects, are considered weeds or combination of all these, and therefore should be considered for removal regardless of any development.

Consideration has also been given to the relationship of the trees to one another and their proximity to the likely development areas on the site. For example, trees that are part of a closely spaced group, or are likely to be significantly misshapen or unstable with the removal of surrounding trees and structures are considered with these factors in mind.

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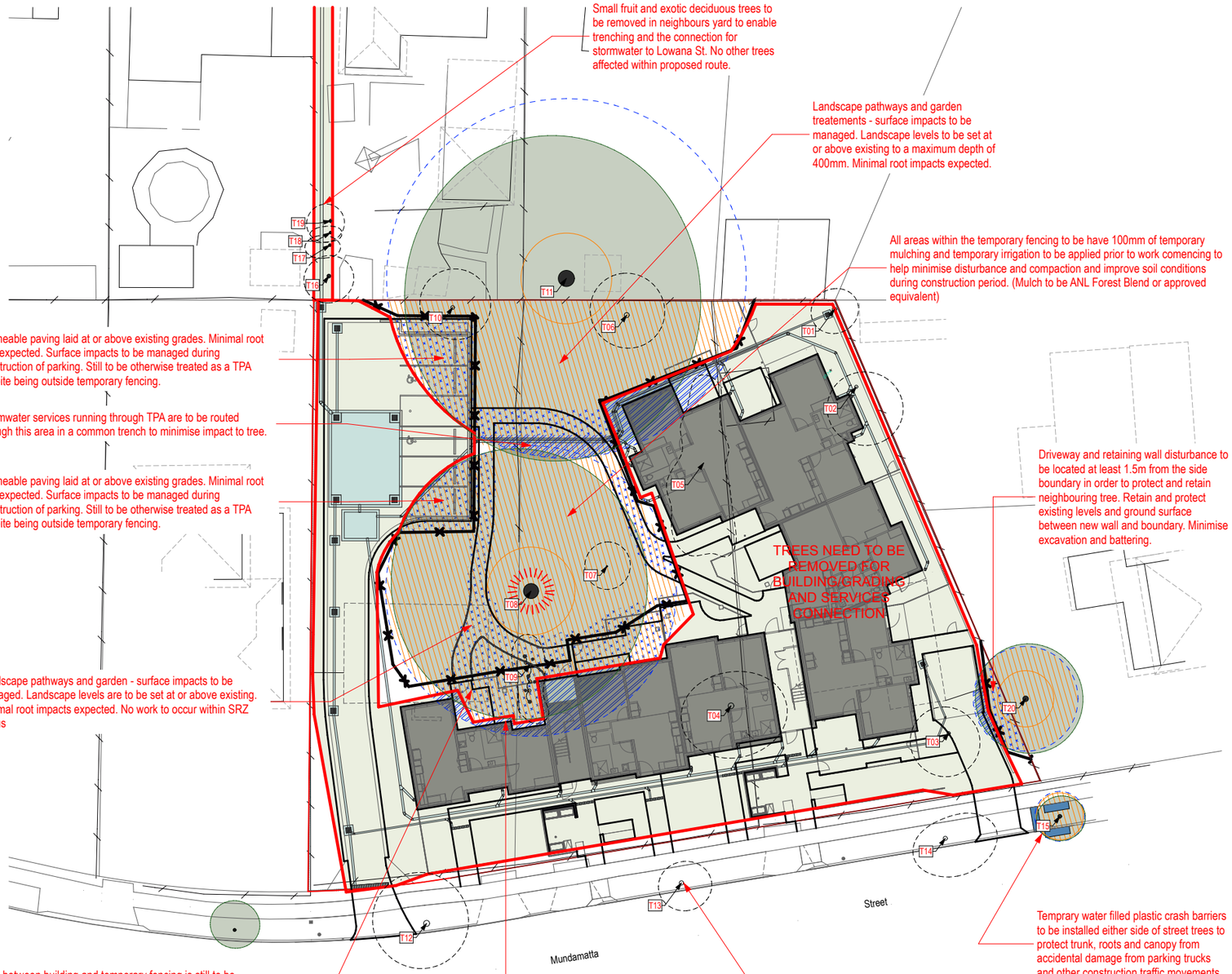
REVISION	DESCRIPTION	CHKD	DATE
B	For Development Application-Street trees shown removed	RWS	14/2/23
A	For Development Application	RWS	14/11/22

PROJECT & CLIENT
18-22 Mundamatta Street, Villawood
NSW Land and Housing Corporation

Project No : 22.03
Designed : RWS
Drawn : RWS/AH
Scale : 1:200@A1/1:400@A3
North

DRAWING TITLE: Tree Retention Value Plan
DRAWING NUMBER: T-01
REVISION: B

Plotted at : 9:29 am 14/2/2023



LAHC - 18-22 Mundammatta Street, Villawood - Tree Assessment Schedule

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7	1	*Acacia longifolia*	**Golden Wattle**	0.08	0.11	2.00	1.31	**Low**	Remove
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20	1	*Jacaranda mimosifolia*	**Jacaranda**	0.35	0.40	4.20	2.25	**Moderate**	Retain

Tree Impact and Protection Plan Legend

- Existing Tree Retained — Extent of canopy as verified by site measure and aerial photos
- Existing Tree Removed (Note: no TPZ's shown for these trees)
- T26 — Tree Identification Number
- Construction Period Tree Protection Area - consolidated area
- Tree Protection Area Temporary Fencing
- Trunk Protection Battens to be installed
- Ground Protection- Rumble Boards to be installed
- Expected loss of roots due to excavation or trenching
- Surface impact to be managed - minimal root loss expected
- Nominal Tree Protection Zone Radius (TPZ)
- Nominal Structural Root Zone (SRZ) shown where relevant
- Proposed Future Building
- Existing building to be demolished
- Extent of ground modification and disturbance

NOTE
Refer to the accompanying Arboricultural Impact Assessment Report for full description of trees, measurements and methods used to assess the trees, and proposed tree protection measures.

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REVISION	DESCRIPTION	CHKD	DATE
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PROJECT & CLIENT
18-22 Mundamatta Street, Villawood
NSW Land and Housing Corporation

Project No : 22.03
Designed : RWS
Drawn : RWS/AH
Scale : 1:200@A1/1:400@A3
North

DRAWING TITLE: Tree Protection and Removal Plan
DRAWING NUMBER: T-02
REVISION: B

Plotted at : 9:28 am 14/2/2023

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TREE PROTECTION SPECIFICATIONS

1. Tree Protection Measures and Protocols.
All work around existing trees to be retained shall be in accordance with AS 4970-2009 Protection of trees on development sites with the clear establishment of the required Tree Protection Areas (TPA's). If the scope of work allowed within or the extent of the Tree Protection Areas of existing trees is not clear, please refer to the Contract Manager or Project Consulting Arborist for clarification.

Before any site works commence tree protection zones and other measures must be established and conveyed to those all working on the site. The Contractor shall ensure all subcontractors are inducted prior to working on the site. All inductions shall include description and identification of the Tree Protection Zones and the restriction on work and activities with regard to trees.

Damage to roots or degradation of the soil through compaction and/or excavation within TPA's is likely to cause serious damage to the tree. Any work operations required within TPA's must be carried out with extreme care. All trees, palms and other shrubs within TPA's are to be retained unless shown otherwise on the Tree Protection Plan(s). Trees marked for retention shall not be used to display signage, or as fence or cable supports for any reason. No materials stockpiling, chemicals or washout areas are permitted immediately upslope of or within the Tree Protection Area. The washing down of wheel barrows, paint cans/brushes, acids and the like shall not to be done near existing trees as the runoff is very harmful to tree roots.

No fuel powered pumps or generators or air compressors are to be placed within TPA's. No fuel or chemicals shall be stored and no equipment or vehicles shall be serviced or re-fuelled within a TPA.

2. Controlled Construction Access
Construction access points, stockpiling and storage areas shall be clearly identified on site and fenced off where appropriate. Uncontrolled access and parking of vehicles inside TPA's shall be avoided. If access is required through a tree protection area, the access way shall be treated with ground protection.

3. Tree Protection Fencing & Signage
The Tree Protection Plan(s) shows the extent of areas to be fenced and protected. Protection measures shall be certified as adequate by the Project Consulting Arborist. This fencing may form part of the general construction site fencing, where practical. It shall remain in place as long as possible and typically not be removed until the final landscape installation in those areas begins.

All tree protection fencing shall be 1800mm high galvanised chain wire or welded steel mesh. Fencing must be bolted together and secured with the necessary back stays and bracing.

Star pickets with bunting or danger tape shall not constitute acceptable tree protection fencing.

Suitable signage as defined by AS 4970-2009 Appendix C shall be affixed to the external side of the fencing at a spacing of not less than 1 sign per 20 lineal metres of fence.

If fence locations conflict with the proposed works, contact the Project Consulting Arborist and Contract Manager for resolution. No new services (unless under-bored) shall be located within or through the Tree Protection Area.

4. Trunk and Lower Branch Protection
A trunk barrier is to be erected around the circumference of the tree trunk and root buttress where shown. This barrier will consist of two to three 'rings' of 50mm diameter socked ag-line wrapped around tree trunk or branch and the ends cable tied to secure in place. A layer of battens is to be placed over and tight to the ag-lines. The battens are to have a maximum spacing of 50mm. The height of the battens is to be 2 metres or to the height of the first branches. Lower large branches may require the same protection if likely to be damaged by passing vehicles or equipment. Secure battens in place with galvanised steel bracing straps. Do not nail into or otherwise injure the trunk or bark. Battens may be made from any suitable waste timber of similar sizes and depths. All sharp or protruding edges are to be properly covered with tape or similar padding.

5. Works within the TPA's
All work within the root zone of existing trees shall be undertaken with the utmost care. If by necessity a tree requires removal of branches for building or access, pruning shall be done in strict accordance with accepted arboriculture techniques and AS 4373-2007. No rubbish, spoil or new materials shall be placed on the root zone of any existing tree or against their trunks.

6. Ground Protection
If it is proposed to create any access route, or similar, within the TPA of a retained tree, the Contractor shall install rumble boards over the TPA ground surface. No excavation shall be allowed. Contractor shall first place a suitable permeable geotextile to the extent required and then a 100mm thick layer of wood chip mulch or coarse no-fines gravel over the extent to be covered. Then place hardwood boards (minimum 3600 x 200 x 75mm) on their flat edge, side by side, with a 30 - 50mm gap to form a rumble strip. These boards are to be held together with three galvanised metal bracing straps nailed to each board. The two outer straps are to be approximately 200mm in from the ends of the boards. The third strap is to be along the centre line of the boards.

7. Provision of Temporary Irrigation
A temporary and automated (battery powered timer is sufficient) watering system to be placed within the TPAs of all trees to maintain adequate water to the retained trees and help maintain their healthy condition. This shall be a surface mounted 'residential-style' soaker hose and/or similar surface sprinkler systems. It is to be surface visible and spray delivered so that is operation can be easily visible and verified. It should be on a designated supply line, separate from other construction related water supplies to minimise its likelihood of being disconnected.

Typically, during spring and summer months it should be set to run for a minimum of 30 minutes every day, in the early morning. During, autumn and winter months it should be set to run for 1 hour once every week. The operation can be suspended temporarily in periods of extensive and prolonged rain.

The system is to remain in place for the duration of construction, or until the project consulting arborist approves it's removal. It may be removed to allow final landscape treatments to proceed. If accidentally disturbed or damaged by construction activities, it is to be reinstated as soon as practicable.

8. Structural Demolition Within TPA's
Project Consulting Arborist shall be on site during all demolition work within the TPA's to monitor and advise on tree protection. Secateurs and a handsaw shall be available to deal with and cleanly cut any exposed roots that have to be cut. Machines with a long reach may be used if they can work from outside TPA's or from protected areas within TPA's. They shall not encroach onto unprotected soil in TPA's.

Debris to be removed from TPA's must be moved across existing hard surfacing or temporary ground protection in a way that prevents compaction and disturbance of soil. Alternatively, it can be lifted out by machines provided this does not disturb TPA's or damage the canopy. If appropriate, leave below ground structures such as footings and disused pipes in place if their removal will cause excessive root disturbance.

When pulling up existing paving the Contractor shall work backwards, lifting demolished paving back onto the existing paving. Roots may be found growing under the pavement and should not be trafficked. Roots growing into existing sub-base should be left and new surface finishes placed over the top without disturbance.

9. Excavations or Trenching within TPA's
Excavation within TPA's shall not be allowed using mechanical equipment such as excavators or backhoes. Excavation within TPA's shall only be carried out carefully by hand taking care not to damage the bark and wood of any roots. Specialist tools for removing soil around roots using compressed air (air spade), or water vacuum extraction shall be an appropriate alternative to hand digging and is the preferred method.

Exposed roots to be removed shall be cut cleanly with a sharp saw or secateurs at the face of the excavation. Roots temporarily exposed must be protected by appropriate covering with damp hessian or sand. Roots greater than 50mm in diameter are to be retained and shall only be cut in exceptional circumstances and only after consultation with the Project Consulting Arborist. Roots greater than 100mm in diameter shall typically not be allowed to be cut and must be worked around.

10. Soft Landscaping Installation
Final trimming and planting shall be judiciously undertaken around trees. All soft landscaping within the tree protection zones will be installed with care to avoid root disturbance from irrigation trenching, lighting installation and the planting of larger plants. Permanent irrigation (if used) shall be installed as spray heads located outside of TPA's and spraying inwards. All other services such as small-scale electrical services shall also be designed and installed to avoid any excavation or trenching around the trees.

No significant excavation or cultivation, especially by rotary hoes or excavators, shall occur within TPA's. Where new designs require the levels to be increased, good quality and permeable top soil shall be used. It should be firmed into place but not over compacted. All areas close to tree trunks shall be kept at the original ground level. Where turf is to be installed tree trunks shall have mulched rings applied rather than grass laid up to the trunk.

The size of the installed plants shall typically be less than 5L pots so that the maximum depth of the new root balls is less than 200mm. Any planting proposed that is larger than this shall be only installed outside of the SRZ and with care to not injure roots while digging planting holes.

11. Canopy Pruning
The Contractor shall prune branches of protected trees only as directed by the Project Consulting Arborist. Pruning is only to be undertaken by a qualified arborist (under the supervision of a person with AQF Level 4 or above). The Project Consulting Arborist is to be present at all times during the pruning work. Work is to be in strict accordance with AS4373 Pruning of Amenity Trees. Do not treat wounds.

12. Root Pruning
Pruning of roots of protected trees shall only be as directed the Project Consulting Arborist. The Tree Contractor shall use only a qualified arborist (AQF Level 4 or above). The Project Consulting Arborist is to be present at all times during the root pruning.

Roots are not to be cut using normal excavation machinery of any sort. This usually results in splitting and massive disturbance well past the intended line of cut. When required to cut roots, use hand methods and sharp hand tools (e.g. secateurs, hand saw) such that the remaining root systems are preserved intact and undamaged. Roots are to be cut back by hand square to the direction of the root travel (or edge of the excavation). Do not cut any tree roots exceeding 50mm diameter unless permitted. Excavations within root zones should be kept open for as short a period as possible. Any excavated face containing roots is to be temporarily supported, where necessary, to prevent soil loss from around the other retained roots.

13. Accidental Tree Damage
Should a tree be accidentally damaged, the Contractor shall immediately notify the Project Consulting Arborist. Timing can be of the essence, particularly with bark injuries, trunk damage or chemical contaminations.

If a branch has been broken, it shall be removed and the damaged end pruned to a suitable branch collar. If the branch has been torn out of the trunk, assessment shall be made and the damage cleaned up by as much as possible without further damage to the tree.

If roots are accidentally disturbed or excavated, any broken, crushed and torn sections shall be exposed and pruned leaving clean cuts to minimise risk of infection by fungal pathogens and promote good conditions for new root growth.

Example image of acceptable ground protection rumble boards

Example image of acceptable tree protection fencing measures to be applied. (1.8m high rigid metal fencing with appropriate lateral bracing)

Example image of acceptable tree tree protection battens

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REVISION	DESCRIPTION	CHKD	DATE
A	For Development Application	RWS	14/11/22

PROJECT & CLIENT
18-22 Mundamatta Street, Villawood
NSW Land and Housing Corporation

North
Project No : 22.03
Designed : RWS
Drawn : RWS/AH
Scale : N/A

DRAWING TITLE: Tree Protection Specifications
DRAWING NUMBER: T-03
REVISION: A

Plotted at : 9:28 am 14/2/2023

4.2 Tree Impact Assessment Schedule

LAHC - 18-22 Mundammatta Street, Villawood - Tree Assessment Schedule

Tree ID	Trees in Group	Tree Species	Common Name	Height (m)	Spread Average (m)	Trunk Diameter Breast Height (dbh) (m)	Trunk Diameter at base (dgl) (m)	Nominal TPZ radius (m) 12xdbh (AS 4970)	Nominal SRZ radius (m) (AS 4970)	Age Class	Current Vigour	Current Form	Tree Origin	Noted Defects	ULE Rating	Retention Value	General Comments and Notes	Incursion and Impact	Recommendation
1	1	*Ligustrum lucidum*	**Broadleaf Privet**	4.0	3.0	0.30	0.35	3.60	2.13	Mature	Fair	Average	Weed		Remove (<5 years)	**Nil / Remove**	Weed species. Should be removed.	Weed - remove	Remove
2	1	*Morus nigra*	**Mulberry**	5.0	4.0	0.22	0.25	2.64	1.85	Mature	Fair	Poor	Exotic	Co-dominant Stems, Very Asymmetric Form	Medium (15-40 years)	**Low**	Very asymmetric form. Fruit tree and exempt species under DCP.	Within footprint of works	Remove
3	1	*Callistemon salignus cv.*	**Willow Bottlebrush**	6.0	6.0	0.20	0.25	2.40	1.85	Mature	Good	Average	Native	Co-dominant Stems, Inclusions	Medium (15-40 years)	**Moderate**		Within footprint of works	Remove
4	1	*Ligustrum lucidum*	**Broadleaf Privet**	7.0	6.0	0.40	0.45	4.80	2.37	Mature	Fair	Average	Weed	Co-dominant Stems	Remove (<5 years)	**Nil / Remove**	Weed species. Should be removed.	Within footprint of works	Remove
5	1	*Cestrum parqui*	**Green Cestrum**	2.5	4.0	0.10	0.15	2.00	1.49	Mature	Fair	Average	Weed		Remove (<5 years)	**Nil / Remove**	A mixed vine covered clump of weeds and climbing plants. All less than 3m in height therefore can be removed. No retention value.	Within footprint of works	Remove
6	1	*Ligustrum lucidum*	**Broadleaf Privet**	6.0	5.0	0.35	0.40	4.20	2.25	Mature	Fair	Average	Weed		Remove (<5 years)	**Nil / Remove**	Weed species. Should be removed.	Within footprint of works	Remove
7	1	*Acacia longifolia*	**Golden Wattle**	5.0	4.0	0.08	0.11	2.00	1.31	Mature	Fair	Average	Native	Lean-Minor	Short (5-15 years)	**Low**	Relatively short lived species.	Short lived species. Suggest removal for landscape improvements	Remove
8	1	*Corymbia maculata*	**Spotted Gum**	22.0	19.0	0.97	1.16	11.64	3.52	Mature	Good	Average	Endemic		Long (>40 years)	**High**	Highly prominent tree. Appears to date from the early 1970s. Earlier aerial photos indicate site was completely cleared. Species is endemic to western Sydney but was probably intentionally planted by home owners. Now an extremely large and prominent and healthy tree, clearly visible from surrounding streets and nearby parks. Lines up with views from nearby public pathway from Hume Highway.	Nominal incursion approx 10%. Considered acceptable due to size and health of tree and proposed construction techniques maintaining slabs and other excavation above the existing levels so that lower roots can be maintained. Minor landscaping and pathways only occuring within remaining TPA. Any surface impacts from landscape and carpark construction to be carefully managed.	Retain
9	6	*Cinnamomum camphora*	**Camphor Laurel**	7.0	7.0	0.15	0.25	2.00	1.85	Semi-mature	Fair	Average	Invasive		Remove (<5 years)	**Nil / Remove**	Weedy clump of small saplings. Invasive and exempt species, which should be removed.	Weed - remove	Remove
10	1	*Jacaranda mimosifolia*	**Jacaranda**	9.0	7.0	0.27	0.30	3.24	2.00	Mature	Fair	Average	Native	Co-dominant Stems	Medium (15-40 years)	**Moderate**	Relatively small specimen. Growing under canopy of larger neighbouring Lemon-scented Gum tree.	Incursion from car park construction. Recommend removal for tree planting that is more appropriate to new design.	Remove
11	1	*Corymbia citriodora*	**Lemon Scented Gum**	19.5	22.0	1.20	1.25	14.40	3.63	Mature	Good	Average	Native	Hangers, Deadwood-Minor, Co-dominant Stems	Long (>40 years)	**High**	Located within neighbouring property therefor retention and protection is required. Highly prominent tree. Appears to date from the early 1970s. Earlier aerial photos indicate site was completely cleared. Species not endemic to Sydney. Was probably intentionally planted by home owners. Now an extremely large and prominent and healthy tree, clearly visible from surrounding streets and nearby parks.	Incursions and impacts anticipated to be less than 10%. Minor landscaping and pathways only occuring within remaining TPA. Any surface impacts from landscape to be carefully managed.	Retain
12	1	*Callistemon viminalis cv.*	**Weeping Bottlebrush**	7.0	6.0	0.40	0.47	4.80	2.41	Mature	Fair	Average	Native	Co-dominant Stems, Inclusions, Branch Tearouts, Major Wounding	Medium (15-40 years)	**Moderate**	Street tree. Large basal wound from historic trunk tearout. Located under overhead wires.	Major incursions due to driveway construction. Recommended to be removed and replaced with new street tree at completion of works.	Remove
13	1	*Callistemon viminalis cv.*	**Weeping Bottlebrush**	6.0	5.0	0.23	0.34	2.76	2.10	Mature	Fair	Average	Native	Epicormic Growth	Medium (15-40 years)	**Moderate**	Street tree. Located under overhead wires.	Recommended to be removed and replaced with new street tree at completion of works. (As requested and approved by Council)	Remove
14	1	*Callistemon viminalis cv.*	**Weeping Bottlebrush**	6.0	7.0	0.27	0.33	3.24	2.08	Mature	Good	Average	Native	Epicormic Growth	Medium (15-40 years)	**Moderate**	Street tree. Located under overhead wires.	Recommended to be removed and replaced with new street tree at completion of works. (As requested and approved by Council)	Remove
15	1	*Tristaniopsis laurina*	**Water Gum**	5.0	4.0	0.15	0.26	2.00	1.88	Mature	Good	Average	Native		Medium (15-40 years)	**Moderate**	Street tree. Located under overhead wires.	Nil expected. Protect with water filled barriers to protect trunk and overhanging canopy from construction traffic and parking.	Retain
16	1	*Prunus x blireana*	**Flowering Plum**	4.0	3.0	0.18	0.25	2.16	1.85	Mature	Poor	Average	Exotic		Medium (15-40 years)	**Low**	Located in neighbouring 82 Lowana St in rear yard.	Short lived species. Suggest removal for landscape improvements	Remove
17	1	*Punica granatum*	**Pomegranate**	3.0	2.0	0.10	0.18	2.00	1.61	Mature	Fair	Average	Exotic	Epicormic Growth	Medium (15-40 years)	**Low**	Small tree, located in neighbouring 82 Lowana St in rear yard.	Removed due to impacts from stormwater services installation though neighbouring property. Small fruit tree only.	Remove
18	1	*Punica granatum*	**Pomegranate**	2.5	2.0	0.10	0.18	2.00	1.61	Mature	Fair	Average	Exotic	Epicormic Growth	Medium (15-40 years)	**Low**	Small tree, located in neighbouring 82 Lowana St in rear yard.	Removed due to impacts from stormwater services installation though neighbouring property. Small fruit tree only.	Remove
19	1	*Prunus sp.*	**Plum**	4.0	3.0	0.18	0.24	2.16	1.82	Mature	Fair	Average	Exotic		Medium (15-40 years)	**Low**	Located in neighbouring 82 Lowana St in rear yard.	Removed due to impacts from stormwater services installation though neighbouring property. Small fruit tree only.	Remove
20	1	*Jacaranda mimosifolia*	**Jacaranda**	8.0	6.0	0.35	0.40	4.20	2.25	Mature	Good	Average	Exotic	Epicormic Growth, Co-dominant Stems	Long (>40 years)	**Moderate**	Located in neighbouring 16 Mundamatta St in front yard. Good condition and should be retained and protected.	<10% incursion for adjoining driveway, grading and services. Offset any disturbance to be 1.5m off boundary.	Retain

4.3 Tree Data Summary

ID #	**01**
Species:	Ligustrum lucidum
Common:	Broadleaf Privet
Height:	4.0
DBH: 0.30	DGL: 0.35
TPZ: 3.6	SRZ: 2.13
Current Form:	Average
Current Vigour:	Fair
Age Class:	Mature
ULE:	Remove (<5 years)
Retention Value:	**Nil / Remove**

Comments

Weed species. Should be removed.

ID #	**02**
Species:	Morus nigra
Common:	Mulberry
Height:	5.0
DBH: 0.22	DGL: 0.25
TPZ: 2.64	SRZ: 1.85
Current Form:	Poor
Current Vigour:	Fair
Age Class:	Mature
ULE:	Medium (15-40 years)
Retention Value:	**Low**

Comments

Very asymmetric form. Fruit tree and exempt species under DCP.

ID #	**03**
Species:	Callistemon salignus cv.
Common:	Willow Bottlebrush
Height:	6.0
DBH: 0.20	DGL: 0.25
TPZ: 2.4	SRZ: 1.85
Current Form:	Average
Current Vigour:	Good
Age Class:	Mature
ULE:	Medium (15-40 years)
Retention Value:	**Moderate**

Comments

ID #	**04**
Species:	Ligustrum lucidum
Common:	Broadleaf Privet
Height:	7.0
DBH: 0.40	DGL: 0.45
TPZ: 4.8	SRZ: 2.37
Current Form:	Average
Current Vigour:	Fair
Age Class:	Mature
ULE:	Remove (<5 years)
Retention Value:	**Nil / Remove**

Comments

Weed species. Should be removed.

ID #	**05**
Species:	Cestrum parqui
Common:	Green Cestrum
Height:	2.5
DBH: 0.10	DGL: 0.15
TPZ: 2	SRZ: 1.5
Current Form:	Average
Current Vigour:	Fair
Age Class:	Mature
ULE:	Remove (<5 years)
Retention Value:	**Nil / Remove**

Comments

A mixed vine covered clump of weeds and climbing plants. All less than 3m in height therefore can be removed. No retention value.

ID #	**06**
Species:	Ligustrum lucidum
Common:	Broadleaf Privet
Height:	6.0
DBH: 0.35	DGL: 0.40
TPZ: 4.2	SRZ: 2.25
Current Form:	Average
Current Vigour:	Fair
Age Class:	Mature
ULE:	Remove (<5 years)
Retention Value:	**Nil / Remove**

Comments

Weed species. Should be removed.

ID #	**07**
Species:	Acacia longifolia
Common:	Golden Wattle
Height:	5.0
DBH: 0.08	DGL: 0.11
TPZ: 2	SRZ: 1.5
Current Form:	Average
Current Vigour:	Fair
Age Class:	Mature
ULE:	Short (5-15 years)
Retention Value:	**Low**

Comments

Relatively short lived species

ID #	**08**
Species:	Corymbia maculata
Common:	Spotted Gum
Height:	22.0
DBH: 0.97	DGL: 1.16
TPZ: 11.64	SRZ: 3.52
Current Form:	Average
Current Vigour:	Good
Age Class:	Mature
ULE:	Long (>40 years)
Retention Value:	**High**

Comments

Highly prominent tree. Appears to date from the early 1970s. Earlier aerial photos indicate site was completely cleared. Species is endemic to western Sydney but was probably intentionally planted by home owners.

ID #	**09**
Species:	Cinnamomum camphora
Common:	Camphor Laurel
Height:	7.0
DBH: 0.15	DGL: 0.25
TPZ: 2	SRZ: 1.85
Current Form:	Average
Current Vigour:	Fair
Age Class:	Semi-mature
ULE:	Remove (<5 years)
Retention Value:	**Nil / Remove**

Comments

Weedy clump of small saplings. Invasive and exempt species, which should be removed.

ID #	**10**
Species:	Jacaranda mimosifolia
Common:	Jacaranda
Height:	9.0
DBH: 0.27	DGL: 0.30
TPZ: 3.24	SRZ: 2
Current Form:	Average
Current Vigour:	Fair
Age Class:	Mature
ULE:	Medium (15-40 years)
Retention Value:	**Moderate**

Comments

Relatively small specimen. Growing under canopy of larger neighbouring Lemon-scented Gum tree.

ID #	**11**
Species:	Corymbia citriodora
Common:	Lemon Scented Gum
Height:	19.5
DBH: 1.20	DGL: 1.25
TPZ: 14.4	SRZ: 3.63
Current Form:	Average
Current Vigour:	Good
Age Class:	Mature
ULE:	Long (>40 years)
Retention Value:	**High**

Comments

Located within neighbouring property therefore retention and protection is required. Highly prominent tree. Appears to date from the early 1970s. Earlier aerial photos indicate site was completely cleared. Species not

ID #	**12**
Species:	Callistemon viminalis cv.
Common:	Weeping Bottlebrush
Height:	7.0
DBH: 0.4	DGL: 0.47
TPZ: 4.8	SRZ: 2.41
Current Form:	Average
Current Vigour:	Fair
Age Class:	Mature
ULE:	Medium (15-40 years)
Retention Value:	**Moderate**

Comments

Street tree. Large basal wound from historic trunk tearout. Located under overhead wires.

ID #	**13**
Species:	Callistemon viminalis cv.
Common:	Weeping Bottlebrush
Height:	6.0
DBH: 0.27	DGL: 0.33
TPZ: 3.24	SRZ: 2.08
Current Form:	Average
Current Vigour:	Fair
Age Class:	Mature
ULE:	Medium (15-40 years)
Retention Value:	**Moderate**

Comments

Street tree. Located under overhead wires.

ID #	**14**
Species:	Callistemon viminalis cv.
Common:	Weeping Bottlebrush
Height:	6.0
DBH: 0.23	DGL: 0.34
TPZ: 2.76	SRZ: 2.1
Current Form:	Average
Current Vigour:	Good
Age Class:	Mature
ULE:	Medium (15-40 years)
Retention Value:	**Moderate**

Comments

Street tree. Located under overhead wires.

ID #	**15**
Species:	Tristaniopsis laurina
Common:	Water Gum
Height:	5.0
DBH: 0.15	DGL: 0.26
TPZ: 2	SRZ: 1.88
Current Form:	Average
Current Vigour:	Good
Age Class:	Mature
ULE:	Medium (15-40 years)
Retention Value:	**Moderate**

Comments

Street tree. Located under overhead wires.

ID #	**16**
Species:	Prunus x blireana
Common:	Flowering Plum
Height:	4.0
DBH: 0.18	DGL: 0.25
TPZ: 2.16	SRZ: 1.85
Current Form:	Average
Current Vigour:	Poor
Age Class:	Mature
ULE:	Medium (15-40 years)
Retention Value:	**Low**

Comments

Located in neighbouring 82 Lowana St in rear yard.

ID #	**17**
Species:	Punica granatum
Common:	Pomegranate
Height:	3.0
DBH: 0.10	DGL: 0.18
TPZ: 2	SRZ: 1.61
Current Form:	Average
Current Vigour:	Fair
Age Class:	Mature
ULE:	Medium (15-40 years)
Retention Value:	**Low**

Comments

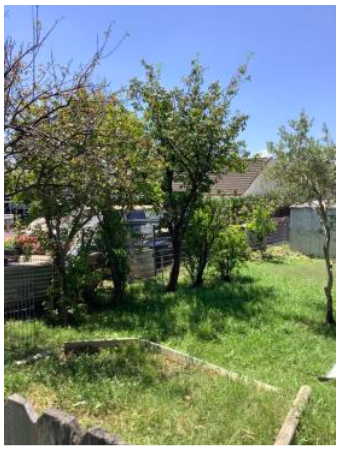
Small tree, located in neighbouring 82 Lowana St in rear yard.

ID #	**18**
Species:	Punica granatum
Common:	Pomegranate
Height:	2.50
DBH: 0.10	DGL: 0.18
TPZ: 2	SRZ: 1.61
Current Form:	Average
Current Vigour:	Fair
Age Class:	Mature
ULE:	Medium (15-40 years)
Retention Value:	**Low**

Comments

Small tree, located in neighbouring 82 Lowana St in rear yard.

ID #	**19**
Species:	Prunus sp.
Common:	Plum
Height:	4.0
DBH: 0.18	DGL: 0.24
TPZ: 2.16	SRZ: 1.82
Current Form:	Average
Current Vigour:	Fair
Age Class:	Mature
ULE:	Medium (15-40 years)
Retention Value:	**Low**



Comments

Located in neighbouring 82 Lowana St in rear yard.

ID #	**20**
Species:	Jacaranda mimosifolia
Common:	Jacaranda
Height:	8.0
DBH: 0.35	DGL: 0.40
TPZ: 4.2	SRZ: 2.25
Current Form:	Average
Current Vigour:	Good
Age Class:	Mature
ULE:	Long (>40 years)
Retention Value:	**Moderate**

Comments

Located in neighbouring 16 Mundamatta St in front yard. Good condition and should be retained and protected.