arboricultural impact assessment report

AIA-01
[Draft] Revision A, Issued for DA
22 February, 2021

DOCUMENT INCLUDES

- TAA-02 Tree Retention Value Plans
- TAA-03 Tree Protection & Removal Plans

PROJECT

International Centre for Training Excellence
Athletes' Accommodation
Blacktown International Sports Park
Eastern Road
Rooty Hill, NSW 2766

CLIENT / PRINCIPAL

Blacktown City Council
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i EXECUTIVE SUMMARY

In December 2020, Arterra was engaged by Savills Australia on behalf of Blacktown City Council (the client) to undertake an arboricultural assessment of the site at Blacktown International Sportspark and prepare the relevant reports and plans to help support the Development Application (DA) for the Athletes' Accommodation (AA) which is an initial part of the International Centre of Training Excellence (ICTE) project.

A tree assessment and impact schedule were completed for the trees within the AA site identified as potentially affected by proposed works. (Refer to Appendix 4.3 – Tree Impact Assessment Schedule). The trees were photographed and given a unique identification number and plotted onto scaled survey base plans for referencing and identification throughout the report and for future discussions and co-ordination with contractors and stakeholders.

The tree population in the AA site is comprised entirely of native Australian species, many of which are also locally endemic species and representative of the Cumberland Plain Woodland Endangered Ecological Community (CPW EEC). In summary, **40** trees were assessed for this report:-

- **26** trees are proposed to be retained and protected,
- **14** trees are proposed to be removed to facilitate the development of the AA.

The main focus of tree retention in the vicinity of this development is the significant row of *Melaleuca linariifolia* (Flax Leaved Paperbark) which flanks the current playing field adjacent to the proposed AA. These are healthy trees and, as a group, provide good amenity to the existing facilities. The design of the Athletes Accommodation buildings has been tailored to avoid serious impacts to these trees. If appropriate tree protection measures are enforced it is the authors' opinion that these trees may be successfully retained.

Figure i – Photo of the relatively consistent row planting of Melaleuca linariifolia that are generally in good condition along the edge of the northern carpark. These trees will be retained and protected. (Photo: Arterra 10/12/2020)

The table below summaries the proposed retention and removal of trees, across the retention values of the trees assessed.

Table A- Tree Removal & Retention Value Analysis

Recommendation	High	Moderate	Low	Very Low (should remove)	Total Trees
Trees to be Retained	2	24	0	0	26
Trees to be Removed	7	7	0	0	14
Totals	**9**	**31**	**0**	**0**	**40**

The other trees recommended for removal are within the footprint of the proposed building, services upgrades and bulk grading works. It should be noted that most native tree species, and Eucalypts in particular, are generally very intolerant of root disturbance and soil compaction within their rootzones. Where the proposed works are likely to result in significant impacts to the tree's long term condition, the tree has typically been recommended for removal.

As with all aspects in the development and construction process, the tree related constraints have to be weighed up against many other relevant development opportunities and constraints. The retention of the trees on the site must also consider economic, social, environmental, construction and practical realities.

This document has been prepared by Arterra Design Pty Ltd, 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

In December 2020, Arterra was engaged by Savills Australia on behalf of Blacktown City Council (the client) to undertake an arboricultural assessment of the site and prepare the relevant reports and plans to help support the development of the International Centre of Training Excellence (ICTE). The Athletes' Accommodation (AA) is an initial part of the International Centre of Training Excellence (ICTE) project.

The client proposes to improve and build on the current facilities to develop the Blacktown International Sports Park (BISP) into a significant sporting centre for use by international, national, state and local sports organisations and clubs, the A.C.U. University for teaching and associated allied health and recovery services. Part of this is the development of an International Centre for Training Excellence (ICTE) and an associated academy style 96 bed accommodation Athletes Accommodation (AA) facility.

This assessment is to accompany the Development Application (DA) for the AA. This report is restricted to the trees within or immediately adjacent to the project site that were likely to be impacted by the proposed AA works. The other trees within the broader ICTE site are addressed in another report.

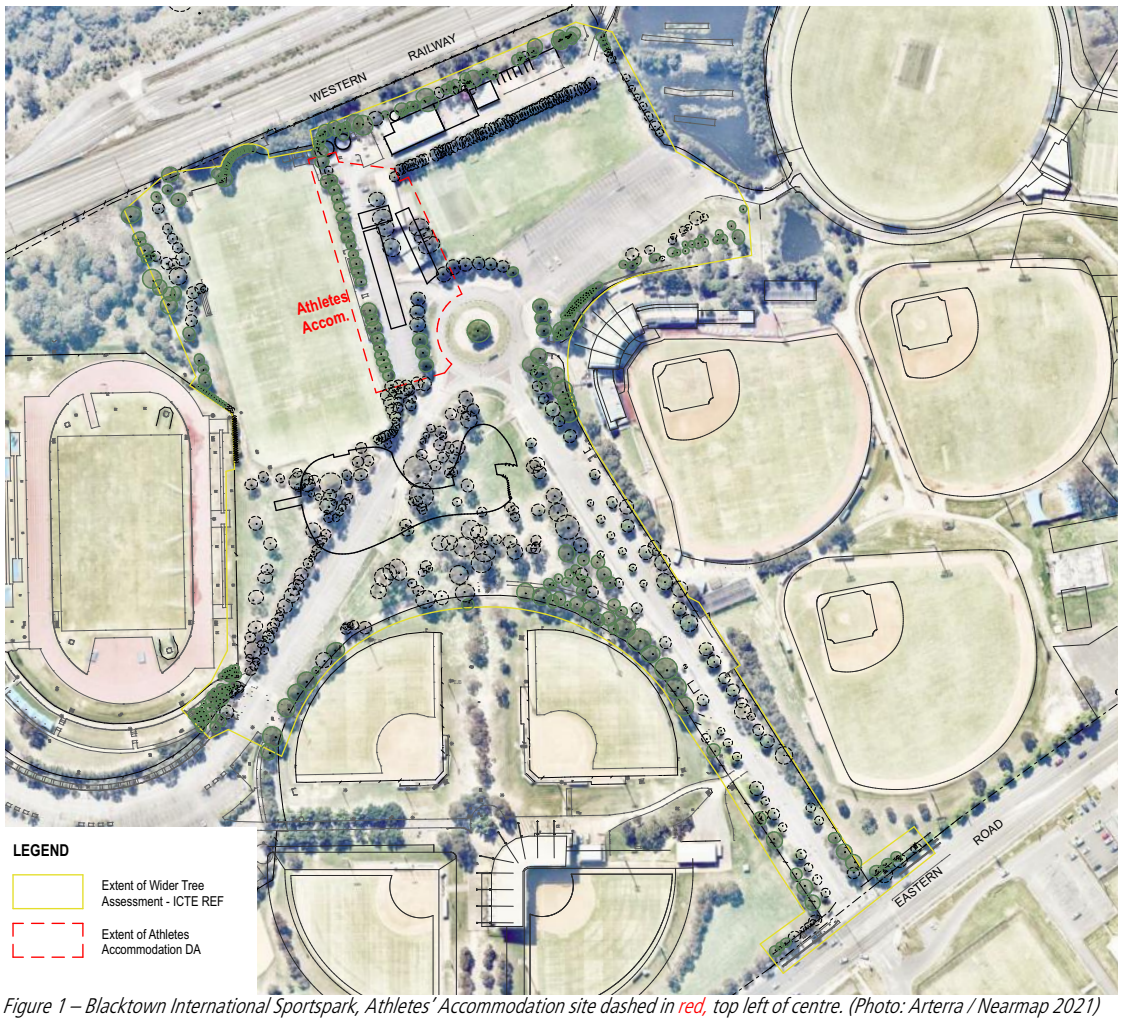


Figure 1 – Blacktown International Sportspark, Athletes' Accommodation site dashed in red, top left of centre. (Photo: Arterra / Nearmap 2021)

The AA site sits adjacent to an existing sports field that will be retained but with minor re-grading and reconfiguration. The AA site currently contains a bitumen carpark, administration and storage buildings, row planting of mature trees, pathways and other infrastructure. The proposed works are likely to have a range of impacts on the surrounding mature trees.

Figure 2 – Photo of the relatively consistent row planting of Melaleuca linariifolia that are generally in good condition along the edge of the northern carpark / soccer pitch. (Photo: Arterra 17/12/2020)

This impact assessment has been prepared to identify the trees to be retained and removed as part of the development and so that the client can take a proactive approach to the management of the trees to be retained and put in place appropriate measures to protect them during the proposed works.

1.2 Aims of This Report

The aim of this report is to assess the impact of the new development on the existing trees identified and recorded within the site. Specifically the report aims to:-

- Assess the health and condition of the trees;
- Accurately record information relevant to the existing trees;
- Assess the significance, Safe Useful Life Expectancy (SULE) and retention values of the existing trees;
- Provide clear recommendations as to which trees should ideally be retained and protected;
- Calculate the Nominal Tree Protection Zones (TPZ) of the trees being retained;
- Identify the proposed Tree Protection Areas (TPA) of the trees being retained and identify and assess the likely arboricultural impacts of the development on the trees and
- Provide preliminary 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 reports 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. Notification of proposed alterations to disturbance within TPZs: Arterra must be clearly notified of any proposed alterations to the plans or additional disturbance in TPZs, so that we can advise on the implications before any work is undertaken.

1.3 Relevant Controls or Legislation

Protection of trees and vegetation in NSW urban areas is now typically administered under the State Environmental Planning Policy (Vegetation in Non-Rural Areas) 2017. This policy aims to protect trees, amenity and biodiversity. For individual trees this will generally mean that a person must not remove vegetation without a suitable permit issued by the local Council. Exception to this requirement may be allowed for dead and dying trees or trees that the Council is satisfied is a risk to human life or property.

For larger numbers of trees, or general vegetation clearing, approval will be dependent on the total area being cleared and the size of the lot upon which the clearing is taking place. If the clearing exceeds a certain threshold, the clearing will require approval from the Native Vegetation Panel established under the SEPP. If it is below certain thresholds, the local Council may still be the authority required to issue a permit.

Blacktown City Council LEP 2015, Clauses 5.9 Tree Preservation, applies to trees and vegetation within the LGA and states: *Unless development approval has been given, or trees are within 3m of the perimeter of an approved building, Council consent is required for the removal of trees as well as for lopping or topping of trees where:*

- *The tree has a height of, or greater than, three (3) metres;*
- *The tree has a trunk diameter of 200mm or more measured at 1.0m above ground level.*

There are no exemptions to tree protection based on tree species.

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 and Chloe Bristow are suitably qualified (AQF 5 Consulting Arborist) to provide comment and the required arboricultural advice pertaining to these matters.

Furthermore, Mr Smart / Ms Bristow confirm that they have read and agree 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 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 demolition /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. TPAs 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.

"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.

Inclusion or Included Bark Branch Union
Growth of bark at the interface of two or more branches on the inner side of the branch union which is unable to be lost from the tree and accumulates, or is trapped, between the acutely divergent branches. This can form a weakened branch union in some species.

Epicormic Growth
Juvenile shoots produced along branches or trunks from dormant or latent buds concealed beneath bark. Production can be stimulated by fire, pruning, wounding or root damage and may also be an indicator of tree stress or decline.

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, but pressures must be reduced to avoid damaging the roots protective bark covering. 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.

1.6 Documents Reviewed

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

ARM Architecture:-

- Blacktown ICTE Master Plan – Schematic Design CAD File, received 4/12/20
- General Arrangement – Floor Plan – Maintenance Shed Option B, received 15/12/2020

Scott Carver Architects:-

- Blacktown City ICTE – Tree Removal, Retention & Proposed. Plan 1 Ref:20180024 – LD-SK012 Rev. A
- Blacktown City ICTE – Tree Removal, Retention & Proposed. Plan 2 Ref:20180024 – LD-SK013 Rev. A

Northrop Engineers:-

- Civil Documentation Detailed Documentation and Stormwater Management Plans for Athletes Accommodation – DAC04.01 issued February 2021

At present we have not reviewed any detailed and proposed servicing plans for the hydraulics (water and sewer), electrical or telecommunications for the development but have assumed that no new services are proposed to be extended into or through the proposed TPAs and any existing redundant services, that are no longer required, will be simply capped off and left in situ where within TPAs.

1.7 Site Location, History and Context

Blacktown International Sportspark is located on Eastern Road, Rooty Hill, 4.8km from the Blacktown CBD and 35km north-west from the Sydney CBD. The site was generally established for the Sydney 2000 Olympic Games. Facilities for baseball, softball and athletics were constructed and used for the Games and developed in context with the existing local sports fields and facilities. In the period since the Games, additional sporting facilities have been added, some as a result of commitments by other sporting bodies and teams. These include the training and playing facilities for AFL NSW/ACT, Cricket NSW and the Blacktown Football Park.

Council seeks to improve and build on the current facilities to develop BISP into a significant sporting centre for use by international, national, state and local sports organisations and clubs, Australian Catholic University for teaching and associated allied health and recovery services.

Prior to its development for the Sydney 2000 Olympic Games the site appears to have been used for largely agricultural pursuits. 1978 aerial imagery shows the site had been partially cleared for pastural land in the northern portion adjacent the railway lines. Some form of intensive indoor farming was in the western portion while the central portion retained a substantial stand of trees.

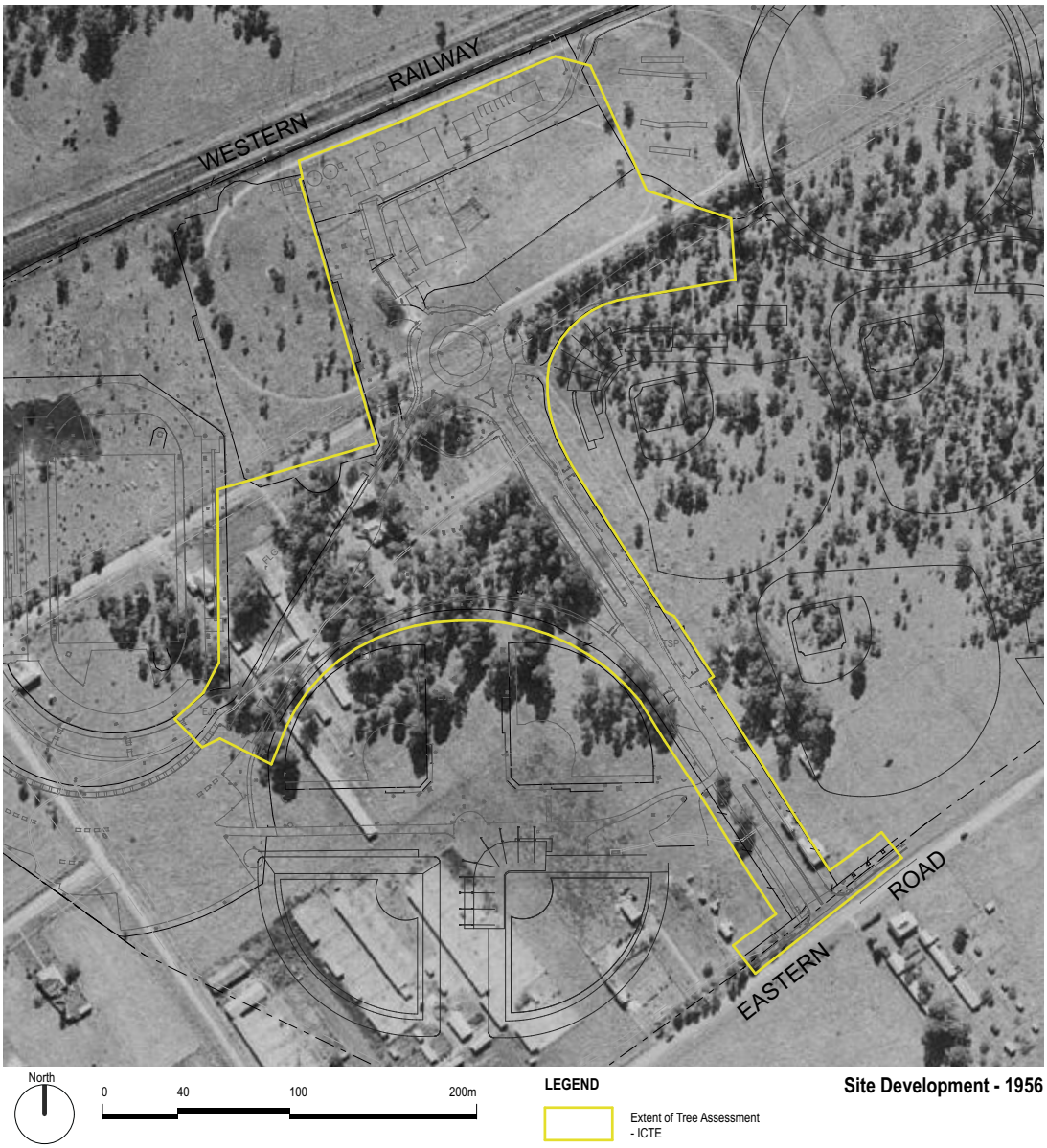


Figure 3 – 1956 Aerial – 2020 tree survey extent outlined in Yellow. Sydney 2000 works outlined in black (Image: DPIE Spatial Services / Arterra, 2020)

The works in preparation for the Sydney 2000 Olympic Games, and since, resulted in significant site wide disturbance with substantial earthworks required to provide appropriate levels to accommodate the various sporting venues. The earthworks resulted in the removal of most of the trees across the site. A relatively few trees that were possibly retained from earlier periods appear to be primarily in the triangular open space formed at the intersection of Blacktown Olympic Drive and Endurance Way. The 1956 and 1978 aerial photos suggest some of the trees remaining in this area today, may remain and predate the substantial reconfiguration works undertaken for the Sydney 2000 Olympics.

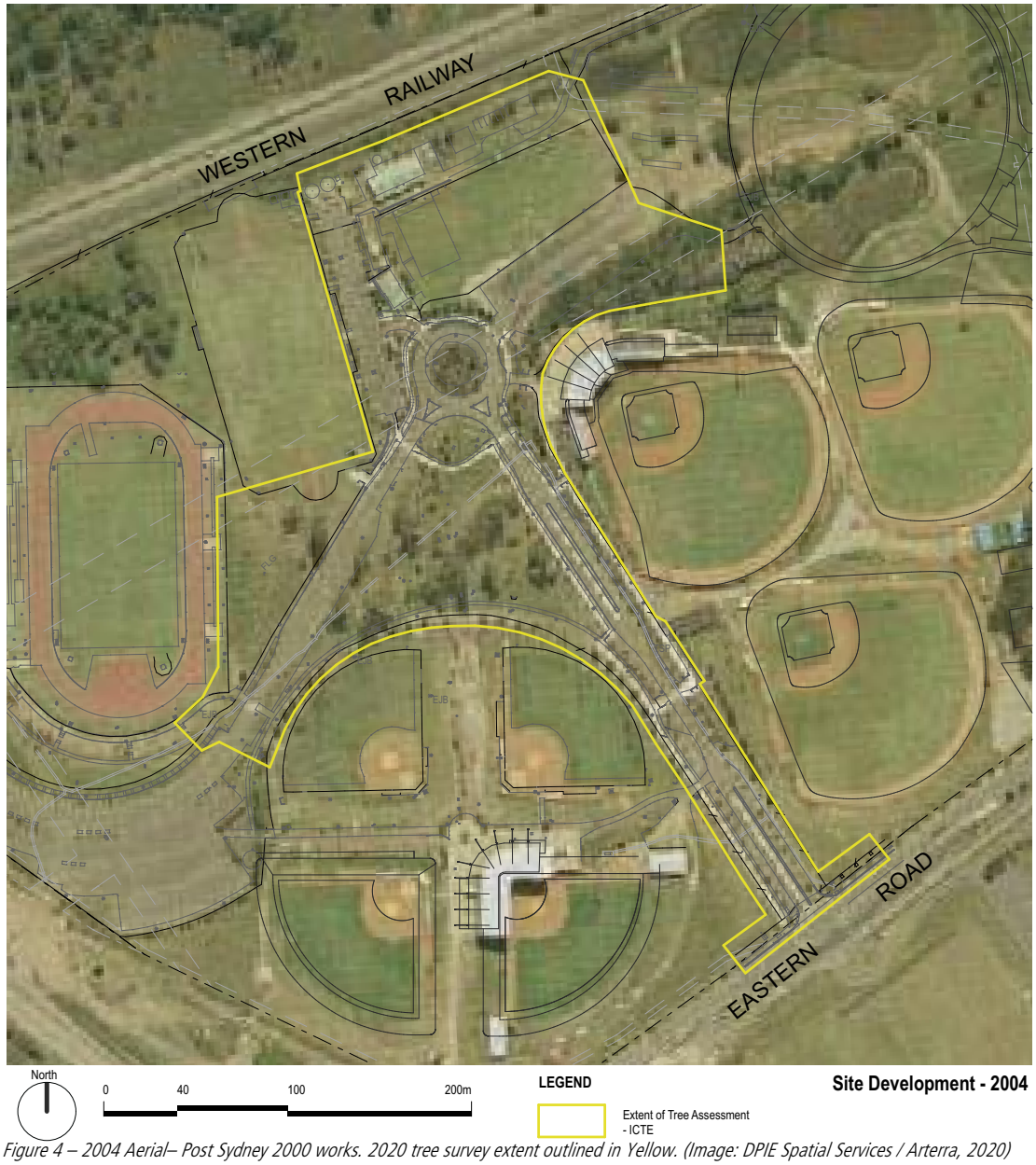


Figure 4 – 2004 Aerial– Post Sydney 2000 works. 2020 tree survey extent outlined in Yellow. (Image: DPIE Spatial Services / Arterra, 2020)

Figure 5 – 2020 Aerial– Current site configuration. Tree survey extent outlined in Yellow. (Image: Nearmap / Arterra, 2020)

1.8 Site Ownership and Zoning

The site is managed by Blacktown City Council (Council) and is identified as Lot 1 of DP 1145826. It has a land area of approximately 44 ha. It is bounded by TfNSW rail lines to the north, Westlink M7 to the west, Eastern Road to the south with a separate sporting field between the Sportspark and Knox Road to the east.

The site is part of the Western Sydney Parklands (zoned under State Environmental Planning Policy (Western Sydney Parklands) 2009 as Regional Open Space (Blacktown Council online mapping).
(https://maps.blacktown.nsw.gov.au/ accessed 14/12/2020)).

1.9 Assessment Methodology

On the 10, 11 and 17 December 2020 Robert Smart and Chloe Bristow of Arterra completed a detailed assessment of existing trees located within the site and likely to be impacted by the proposed development. The trees' health and condition were assessed via a visual inspection of the trees from the ground only. Requisite tree data (including DBH, DGL, height & canopy spread, condition & proximity to services) were 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 and given a unique identification number 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 T02 'Tree Retention Value Plan' & 4.2 T03 'Tree Protection & Removal Plan'). 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.

A representative soil sample was taken in the immediate vicinity of the trees along the east side of soccer pitch and tested for pH, structure, colour and soil texture class to get a basic understanding of likely soil conditions and topsoil depths surrounding the trees. The testing was done using a Dormer 50mm Ø hand soil auger.

Tests for pH were done using a Manutec field pH test kit. Soil structure was assessed by observation of soil pedality and soil texture assessment was done using procedures outlined for the field-testing of a moist bolus by McDonald et al, 1998 and Roberts, et al, 2006.

No exploratory excavations were done to determine location and condition of roots and no detailed soil laboratory testing was undertaken. 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 proposed works were imported into Arterra's standard CAD software (ArchiCAD v24) and superimposed over the tree and site survey information. The extent of site disturbance was analysed for the proposed building works, landscaping, services and other site grading. An assessment was made of the likely extent of impacts on the TPZs, taking into account the likely construction impacts depending on the type of work being undertaken (ie: cut or fill, suspended slabs, decks, service trenches). Various area calculations and measurements were made in the CAD software of the likely incursions into the TPZs or SRZs.

Recent aerial photography data was obtained from the Nearmap website with aerial photos of the site dating from October 2020 imported into the above software for cross checking and assessment. (http://www.nearmap.com/ accessed 09/12/2020)

Climatic data was obtained from the Bureau of Meteorology using statistics from Prospect Reservoir which is located approximately 5km to the south east of the site. (http://www.bom.gov.au/climate/data/ accessed 14/12/2020)

1.10 Tree Assessment – Tree Retention Values

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

SULE

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 SULE means the tree is presently expected to live longer than 40 years with minimal intervention and cost. A short SULE indicates a tree that is not expected to live longer than 5 years or may require substantial intervention or costs to retain it.

RETENTION VALUE

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 may also be lesser quality trees, but part of an important grouping of trees. 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. They may also be lesser trees, but part of an important grouping of trees and therefore warrant retention based on the group's value.
3. **"Low" Retention Value** – these are trees that are in poor condition or have structural defects, are particularly small or commonplace, 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, exhibit 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 and other 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 – Nominal Tree Protection Zones

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 tree's 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 TREE RELATED FINDINGS & OBSERVATIONS

2.1 The Proposed Development

The proposed building and development will result in a major site disturbance. This will potentially have a significant impact on the trees within and adjacent to the AA site.

Specifically the proposed development will involve:-

- Major demolition works;
- Use of large scale civil and earthmoving equipment;
- Access to and from the site with large trucks and construction plant;
- Major excavations;
- Large stockpiles of excavated material and demolition waste;
- Stockpiles/ storage of building materials;
- Regrading and filling of the surface levels;
- Trenching for services;
- Major building works involving concreting, painting and general construction;
- Use of large cranes;
- Parking for site personnel and deliveries;
- Paving and retaining walls and
- Landscaping.

Key Assumptions:-

- All excavations that are undertaken near trees to be retained are to be undertaken and retained using temporary shoring or other methods such as sheet, soldier or contiguous piling techniques to minimise the temporary batter slope extents. Even relatively small excavations, when done near to trees can have devastating and unintended consequences. No cut battering is to extend into nominated TPAs.
- Despite the above, the line of disturbance outside of a new building line has been typically estimated at least 2.5m from the face of the building to allow for provision of water proofing, services, access and scaffolding around the building during construction.
- All services for the new buildings will typically enter and exit from the existing roadways and will be able to be designed to be clear of any the retained trees nominated TPAs.
- Concrete will typically be pumped and will not require any truck movements through TPAs.
- Where no spot levels are indicated it is assumed that the existing surface levels are retained.
- It is assumed that any new landscape grading required within the TPAs will be minimal.
- That traditional cantilevered retaining wall footings will be used (ie: footings extending to the rear of the face of the wall, typically equalling the height of the wall).

2.2 Climate and Microclimate

Blacktown is located within the Greater Western Sydney region. The general climate of this region has moderate temperatures, reasonable rainfall and minimal climatic and weather extremes. It is typically described as a temperate climate with hot to warm summers and cold winters, with relatively uniform rainfalls greater than 800mm / year. There is no distinct dry season.

Blacktown is located more than 34.0km inland from the ocean and the coastal beaches of Manly. Climate statistics have been obtained from the Prospect Reservoir weather station, approximately 5km to the southeast. The area has an average annual rainfall of 874mm, fairly evenly spread across the year but with a drier period during late winter. The highest rainfall period is usually February and March, both with an average of 99mm and the driest month being September with an average of 47mm.

Maximum average daily temperatures range from 28.6ºC in January to 16.9ºC in July. The minimum average daily temperatures range from a high of 17.8ºC in February down to lows of 6.1ºC in July. The primary wind direction is from the south-west in the mornings, becoming stronger in the afternoons. The strongest winds (>40km/h) are normally experienced from the west or south westerly directions and later in the day.

The site is very flat and may typically be defined as a moderately sheltered location. There are no prominent microclimatic influences on the site. (*http://www.bom.gov.au/climate/averages/tables/cw_067019.shtml, accessed 14/12/2020)*

2.3 Soils and Landform

The naturally occurring soils would be clay soils occurring over Wianamatta Shales. The natural soil landscape association expected would be the Blacktown Association. These soils are characterised by moderately reactive, highly plastic clay subsoils, low soil fertility and poor drainage. (Bannerman & Hazelton, 1990). A soil sample was taken from amongst the row of trees adjacent to the northern carpark. It was reflective of the natural soils apart from the pH, which was alkaline rather than acidic. This is most likely due to the proximity to an asphalt car park and the heavily fertilised playing field.

In summary, the topsoil was approximately 150-250mm deep with a 'sandy clay' texture with weakly pedal, medium sized brown peds, and a pH 8.0 which is mildly alkaline. The subsoil below was 'medium clay' texture with moderately pedal, medium to course subangular blocky peds and a moderately alkaline pH of 8.5.

Figure 6 – Typical Soil Profile to a depth of 600mm. (Photo: Arterra, 11/12/2020)

2.4 Tree Assessment - General

A total of **40** trees were assessed for this report their condition varied from excellent to very poor with the majority displaying good to fair vigour. Many trees are planted in rows defining the perimeters of sporting fields, pedestrian pathways and car parks. The tree population in the portion of the site assessed for the AA is comprised entirely of native Australian species, many of which are locally endemic species and representative of the Cumberland Plain Woodland Endangered Ecological Community (CPW EEC).

All **40** trees assessed are Australian native species. Most trees appear to have been planted at a similar time around 1999 to 2001, with the age class distribution now being heavily skewed towards mature. There are very few young or over -mature trees present.

Table 1- Tree Retention Values

Tree Retention Value	No. of Trees
High	**9**
Moderate	**31**
Low	**-**
Nil/Remove	**-**
Total Population	**40**

Table 2- Existing Tree Population – Species Composition

Species Name	Common Name	Number of Trees
Melaleuca linariifolia	**Flax Leaved Paperbark**	24
Araucaria bidwillii	**Bunya Pine**	7
Angophora floribunda	**Rough-barked Apple**	4
Corymbia maculata	**Spotted Gum**	3
Eucalyptus amplifolia	**Cabbage Gum**	1
Eucalyptus sideroxylon	**Mugga Ironbark**	1
Total Population		**40**

Detailed information on each tree including heights, trunk diameters, canopy spreads, age classes and condition are all provided in Appendix 4.3 - 'Tree Impact Assessment Schedule'. Tree retention and removals are discussed in more detail in Section 3 'Tree Management Recommendations'.

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.

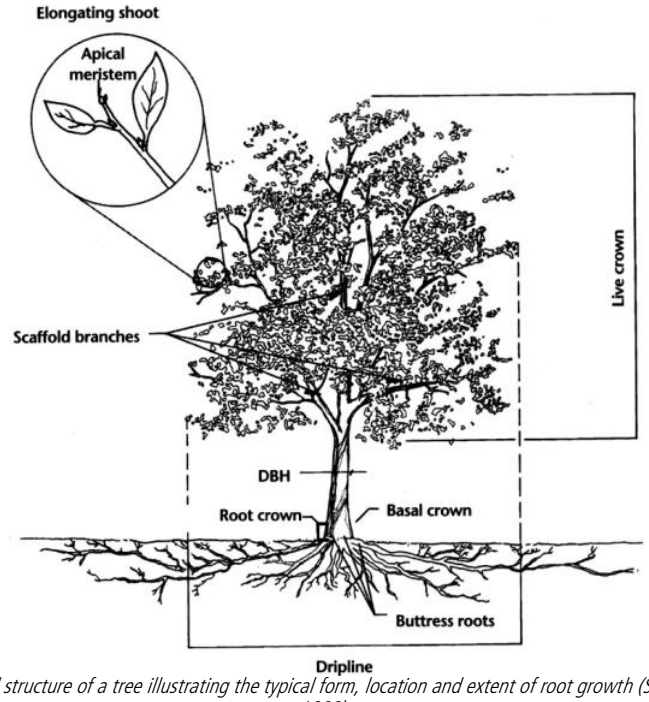


Figure 7 – Typical form and structure of a tree illustrating the typical form, location and extent of root growth (Source: Matheny and Clark, 1998)

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 provide an analysis of the existing tree population in the vicinity of the proposed works then clearly illustrate the trees to be retained and removed as part of the proposed development. A listing of the trees and their likely construction related incursions, impacts and recommendations as to retention or removal for each tree is shown in Appendix 4.3 – Tree Impact Assessment Schedule.

Some of the retained trees will experience minor encroachments within their nominal TPZ radius, as defined under AS 4970 – Protection of Trees on Development Sites. They are clearly shown in Appendix 4.2, TAA-03'Tree Protection & Removal Plans'. These typically very minor encroachments are unlikely to entail immediate or extensive root loss.

It is the authors' opinion that every effort has been made to retain and protect trees with a view to maximising the retention of native trees and to capitalise on their ecological, environmental and aesthetic values for the project.

Trees that are proposed for removal due to significant conflicts with the proposed works are not discussed further in this section.

T349 – *Eucalyptus amplifolia* (Cabbage Gum)
This moderate retention value tree is located at the north western corner of the site, immediately to the north of the adjacent row planting of *Melaleuca linariifolia* (Flax Leaved Paperbark). This tree is likely to experience a minor incursion (<10%) into the southern portion of its nominal TPZ due to the installation of a new stormwater drainage pit. Given the current early mature age and condition of the tree and no other likely disturbance, this incursion is considered acceptable and unlikely to have any significant impact to the condition of the tree.

Figure 8 – T349 Eucalyptus amplifolia (Cabbage Gum) to the left of the row planting - T351 - T372 of Melaleuca linariifolia (Flax Leaved Paperbark) (Photo: Arterra 2020)

T352-T372 – *Melaleuca linariifolia* (Flax Leaved Paperbark)
This row planting of moderate retention value trees is on the western boundary of the adjacent sports field. The generous, mulched planting area is level with the adjacent carpark to the east. It is our understanding the levels surrounding these trees can be retained at the existing levels. A new drainage line is proposed to be installed parallel and to the east of the row planting. This row of trees has been a focus for retention and should only have minor incursions and impacts due to excavations for services and the adjoining AA building. The drainage line has been located to cause minimum disturbance to the trees and is primarily outside the nominal TPZ for majority of the adjacent row planting. Any incursion is <10% and considered unlikely to have any significant impact to the condition of the trees. The establishment of temporary fencing and exclusion of all work within the TPA will be essential to their successful retention. Any redundant services (ie stormwater pits) within the nominated TPA are to be capped off and left in situ.

Figure 9 – T351 - T372 – Row planting of Melaleuca linariifolia (Flax Leaved Paperbark) Trees planted slightly above the level of the adjacent bitumen carpark (Photo: Arterra 2020)

T392 - T394 – *Araucaria bidwillii* (Bunya Pine)
This prominent and relatively consistent row planting runs along the eastern side of the existing car park. The trees are growing in a mulched embankment between the carpark and lower foot path to the east. Part of this row of trees has been a focus for retention and should only have a relatively minor incursion <10% to **T394** to the south western portion of its nominal TPZs due to grading and landscaping adjoining the AA building.

The establishment of temporary fencing and exclusion of all work within the TPA will be essential to their successful retention. Any earthworks and construction within 5.2m of these trees should be supervised and overseen by an AQF5 consulting Arborist.

Figure 10 - T394 – Araucaria bidwillii (Bunya Pine) (Photo: Arterra 2020)

2.7 Potential Tree Related Impacts to be Managed During Construction

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

- Root loss and disturbance due to excessive excavation for the roadworks, stormwater drainage and general grading;
- Compaction of the root zones from temporary storage and stockpiling of materials;
- Contamination of the soil from; the preparation of chemicals, wash down/ cleaning of equipment, refuelling of vehicles and dumping of waste;
- Compaction of the root zones from unanticipated temporary haul roads and the parking of vehicles/ plant equipment;
- Root disturbance from cut and fill and soil level changes;
- Physical damage to the tree trunks and lower branches from passing machinery;
- Damage to the tree roots from landscaping and pedestrian pathway construction or irrigation and electrical services installation.

The following Section provides recommendations and proposed measures that aim to minimise and avoid these impacts as much as realistically possible. They should be conditioned by the Council and implemented and monitored regularly throughout the development.

3.0 TREE MANAGEMENT RECOMMENDATIONS

3.1 Potential Amendments to Site Layout and Design

The landscape concept design, civil works and proposed building layout have been developed by the Client and the project team to achieve the necessary project outcomes. Significant efforts have also been made to retain existing trees where practical to do so.

As the current design has been extensively developed to minimise tree impacts and satisfy the project specific requirements, there are no recommendations to alter the designs further at this time.

3.2 Tree Retentions and Removals

40 trees were assessed in the vicinity of the proposed works.

- **26** trees to be retained and protected
- **14** trees to be removed to facilitate the development

The **14** trees recommended for removal are either within the footprint of the proposed works or unacceptably impacted by proposed earthworks. It should be noted that most native tree species, and Eucalypts in particular, are intolerant of root disturbance and soil compaction in the rootzone. Where the proposed works are likely to result in significant impacts to the tree's root zone and long term condition, the tree has typically been recommended for removal.

Table 3- Tree Removal & Retention

Recommendation	High	Moderate	Low	Very Low (should remove)	Total Trees
Trees to be Retained	2	24	0	0	26
Trees to be Removed	7	7	0	0	14
Totals	**9**	**31**	**0**	**0**	**40**

Table 4- Tree Removal & Retention by Species Composition

Species Name	Common Name	Trees Removed	Trees Retained	Total Trees
Melaleuca linariifolia	**Flax Leaved Paperbark**	3	21	24
Araucaria bidwillii	**Bunya Pine**	4	3	7
Angophora floribunda	**Rough-barked Apple**	4		4
Corymbia maculata	**Spotted Gum**	3		3
Eucalyptus sideroxylon	**Mugga Ironbark**		1	1
Eucalyptus amplifolia	**Cabbage Gum**		1	1
Total Population		**14**	**26**	**40**

3.3 Key Recommendations to Reduce Tree Impacts

The following recommendations are made to potentially reduce the negative construction impacts on the trees.

- Appropriately fence all the nominated TPAs for the duration of all major site construction work. See Appendix 4.2 TAA-03 'Tree Protection & Removal Plans' for locations and extent.
- Carefully control and fence access to and from the construction areas so that vehicle movement does not inadvertently occur through any TPA other than for previously assessed and approved incursions.
- Ensure all the proposed above and below ground services are excluded from running through any TPAs beyond already noted incursion.
- Minimise the re-grading of the ground surface within nominated TPAs, beyond any already noted incursions, to meet and match the proposed pathways, field levels and building levels. Where any minor filling is required, limit it to a maximum depth of 300mm above the pre-existing ground levels and ensure it is only quality sandy manufactured organic garden mix.
- Mulching of TPAs where it is noted, (and not already mulched), beyond the noted building incursions, for all retained trees. This will aid tree health during and after construction with moisture retention, removing competition from grasses, and generally improved soil condition within the TPAs.
- Installation of temporary irrigation where noted on drawings or as directed by the Project Consulting Arborist to maintain sufficient soil moisture for tree health, particularly in areas where natural hydrology has been impeded during construction, or when damage, unexpected root loss or prevailing adverse weather conditions dictate.
- Avoid digging into existing root zones for the installation of the proposed landscaping around the trees and installation sizes of new plants to be 5L or less to ensure that excavations are typically less than 200mm in depth. Where possible, it is proposed to build up soil levels in mass planting areas to a

maximum of 200mm above pre-existing levels, to enable the planting to occur without disturbing existing tree roots.

- Do not allow storage or stockpiling of any materials or site sheds within nominated TPAs unless that it can be clearly demonstrated that this will not impact on the tree retention and is subsequently approved in writing by the Project Consulting Arborist.

3.4 Proposed Tree Protection & Construction Activity Sequencing

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

1. A Tree Protection Specification & Plan be prepared and issued as part of the construction contract prior to any construction, earthworks or demolition 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, cranage points, piling methods etc.).
3. Contractors to discuss locations and type of any sediment and erosion controls (if any) and install them with minimal tree impact when within or passing through the TPA.
4. Existing pathways, fences, driveways, furniture and shrubs are to be carefully removed from within the TPAs if they are required to be demolished.
5. Existing surrounding trees are to be removed as shown on TAA-03 'Tree Protection and Removal Plan'. Stumps are to be ground when within 10m of any existing tree to be retained to avoid the use of excavators and the like from grubbing out stumps, which may lead to unintentional damage of any intertwined roots.
6. Designated TPAs are to be mulched with 50-75mm of recycled hardwood woodchip mulch, where noted, to improve soil conditions around tree and remain in place until future landscaping.
7. Trunk protection is to be placed on all trees to be retained, where noted on TAA-03 'Tree Protection and Removal Plan'.
8. The Construction Phase TPA is 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.
9. Any required rumble boards, ground protection, is to be installed to protect TPAs where access is required within TPA.
10. Install temporary irrigation system to TPAs as noted on plans, and if later directed by the Project Consulting Arborist, should damage occur or prevailing climatic conditions dictate
11. Where required, a Utility Arborist is to undertake selective pruning of canopy or branches to facilitate construction of the buildings and the use of any large scale piling equipment without accidental damage to the tree canopies. Pruning is to be done in accordance with AS4373 - Pruning of Amenity Trees and performed by staff with minimum AQF 3 qualification.
12. Plywood is to be placed under any scaffolds or minor works paths if and when running through TPAs
13. Building and civil works are to be undertaken and completed (external).
14. Landscaping works are to be completed in areas that are external to any TPAs.
15. Contractor to remove the TPA fencing and then install any final pathways and landscaping within the TPA that are under the trees, but only after other all other construction is essentially completed.

3.5 Demolition Work Near Trees or within TPZs

Demolition of paths and other structures required within a TPA shall be done with small tracked equipment or by hand, with care to limit damage and disturbance of the root zone. All such work within TPAs shall be supervised and overseen by a qualified Project Consulting Arborist.

3.6 Tree Protection Fencing & Definition of TPAs

Establish a clearly defined tree protection area as indicated in Appendix 4.2 - "T03 Tree Protection and Removal Plans". Install a 1.8m high temporary fence with either plywood hoarding or temporary steel mesh or chain wire fencing with adequate lateral bracing. Fencing shall comply with the requirements of AS 4687-2007 Temporary fencing and hoardings. These areas around the trees shall be delineated as a "Tree Protection Zone" during the remaining construction process, via appropriate weatherproof signage. Access will typically be excluded from these zones and the levels will be left largely at the existing levels with the exception of the installation of the 75mm of mulch. No stockpiling, excavation, trenching, re-fuelling or material storage should be allowed in this area.

3.7 Ground Protection within TPAs

Vehicular movement and access shall typically not be required or approved through the TPAs. If it is necessary and it is proposed to create any access or haul road, or similar, within the TPA of a retained tree, the Contractor shall install rumble strips / 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 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 11 – Example of acceptable Tree Protection Area ground protection

3.8 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 injury 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 12 – Example of acceptable Trunk Protection batten installation

3.9 Provision of Temporary Irrigation

A temporary and automated (battery powered timer is sufficient) watering system to be placed within some of the TPAs 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 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 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.

3.10 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 TPAs 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.

3.11 Final Building and Pedestrian 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 retained trees to achieve any clearances for final pedestrian access. This shall be minimised as much as possible. It is anticipated that the final pruning of any of the retained trees will be less than 5% of the existing canopy and will not have any serious impact to the tree's health or habit.

The branches of the tree shall only be pruned as specifically needed and directed by the Project Consulting Arborist. Work is to be in strictly accordance with to 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.

3.12 Other Tree Protection Measures to be Implemented

The following is a summary of the main 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.

Clearing and Removal of Trees to be Removed

Removal and clearing of existing trees should be done by qualified arboricultural staff with care not to impact or damage other surrounding trees throughout the process. Existing stumps should be grubbed out or ground in a controlled fashion to remove wood that may decay and promote unwanted pathogens.

Communication - Tool Box Meetings and Construction Inductions

All contractors and 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.

3.13 References

- Bannerman, S.M and Hazelton, P.A 1990, Soil Landscapes of the Penrith 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

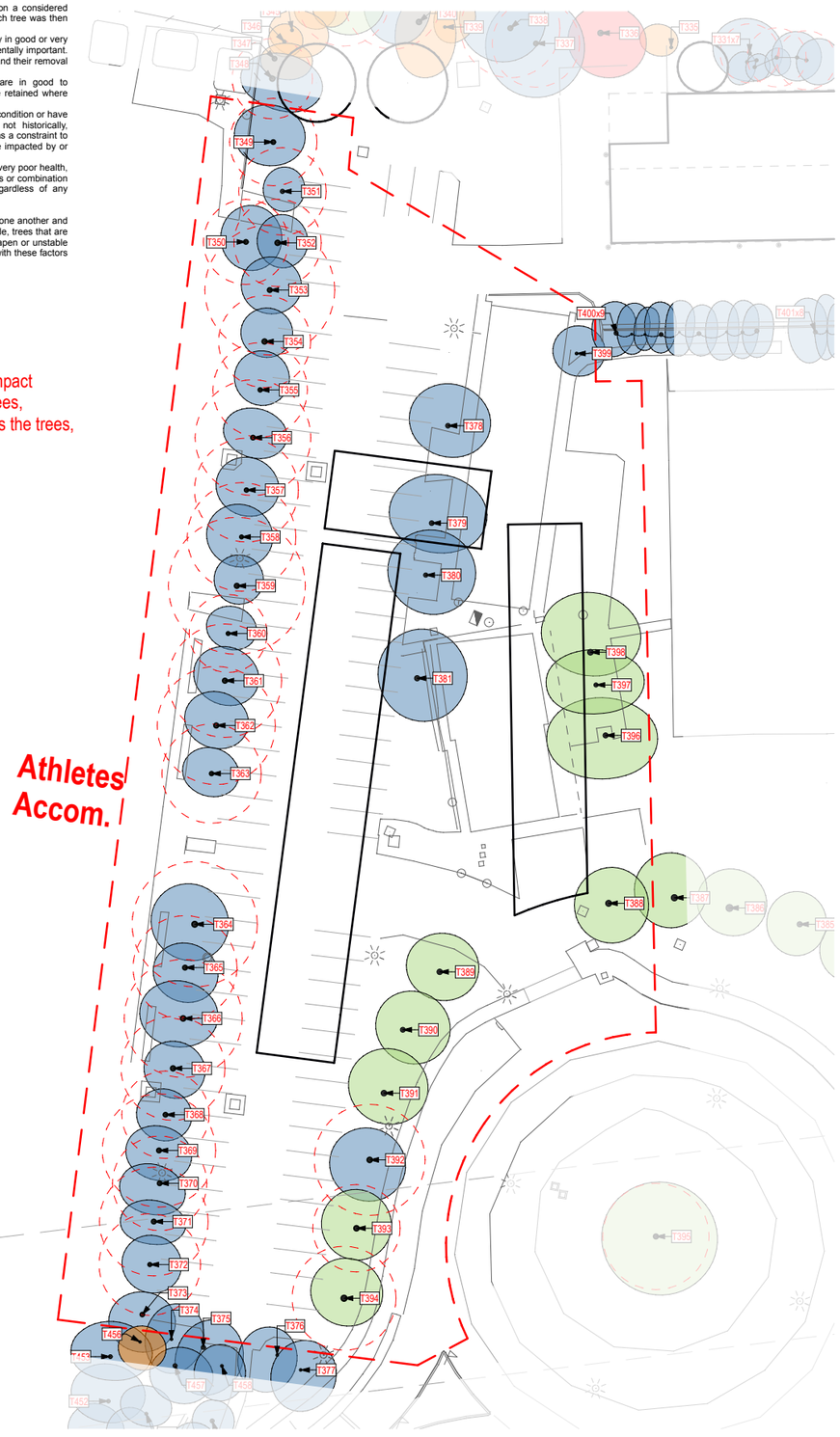
4.1 TAA-02 - Tree Retention Value Plan

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. **"Very Low" 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.

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)
- Very Low 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

Blacktown International Sport Centre - ICTE, Rooty Hill, NSW - Atheltes Accommodation DA - Tree Assessment Schedule

Tree ID	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
349	*Eucalyptus amplifolia*	**Cabbage Gum**	0.37	0.44	4.44	2.34	Moderate	Retain
350	*Eucalyptus sideroxylon*	**Mugga Ironbark**	0.36	0.44	4.32	2.34	Moderate	Retain
351	*Melaleuca linariifolia*	**Flax Leaved Paperbark**	0.37	0.44	4.44	2.34	Moderate	Remove
352	*Melaleuca linariifolia*	**Flax Leaved Paperbark**	0.37	0.50	4.44	2.47	Moderate	Retain
353	*Melaleuca linariifolia*	**Flax Leaved Paperbark**	0.55	0.46	6.60	2.39	Moderate	Retain
354	*Melaleuca linariifolia*	**Flax Leaved Paperbark**	0.39	0.50	4.68	2.47	Moderate	Retain
355	*Melaleuca linariifolia*	**Flax Leaved Paperbark**	0.40	0.40	4.80	2.25	Moderate	Retain
356	*Melaleuca linariifolia*	**Flax Leaved Paperbark**	0.49	0.44	5.88	2.34	Moderate	Retain
357	*Melaleuca linariifolia*	**Flax Leaved Paperbark**	0.44	0.40	5.28	2.25	Moderate	Retain
358	*Melaleuca linariifolia*	**Flax Leaved Paperbark**	0.46	0.35	5.52	2.13	Moderate	Retain
359	*Melaleuca linariifolia*	**Flax Leaved Paperbark**	0.58	0.47	6.96	2.41	Moderate	Retain
360	*Melaleuca linariifolia*	**Flax Leaved Paperbark**	0.33	0.36	3.96	2.15	Moderate	Retain
361	*Melaleuca linariifolia*	**Flax Leaved Paperbark**	0.48	0.48	5.76	2.43	Moderate	Retain
362	*Melaleuca linariifolia*	**Flax Leaved Paperbark**	0.50	0.47	6.00	2.41	Moderate	Retain
363	*Melaleuca linariifolia*	**Flax Leaved Paperbark**	0.42	0.40	5.04	2.25	Moderate	Retain
364	*Melaleuca linariifolia*	**Flax Leaved Paperbark**	0.53	0.56	6.36	2.59	Moderate	Retain
365	*Melaleuca linariifolia*	**Flax Leaved Paperbark**	0.44	0.45	5.28	2.37	Moderate	Retain
366	*Melaleuca linariifolia*	**Flax Leaved Paperbark**	0.50	0.52	6.00	2.51	Moderate	Retain
367	*Melaleuca linariifolia*	**Flax Leaved Paperbark**	0.44	0.49	5.28	2.45	Moderate	Retain
368	*Melaleuca linariifolia*	**Flax Leaved Paperbark**	0.37	0.43	4.44	2.32	Moderate	Retain
369	*Melaleuca linariifolia*	**Flax Leaved Paperbark**	0.48	0.45	5.76	2.37	Moderate	Retain
370	*Melaleuca linariifolia*	**Flax Leaved Paperbark**	0.40	0.44	4.80	2.34	Moderate	Retain
371	*Melaleuca linariifolia*	**Flax Leaved Paperbark**	0.46	0.46	5.52	2.39	Moderate	Retain
372	*Melaleuca linariifolia*	**Flax Leaved Paperbark**	0.43	0.37	5.16	2.18	Moderate	Retain
373	*Melaleuca linariifolia*	**Flax Leaved Paperbark**	0.38	0.41	4.56	2.28	Moderate	Remove
378	*Angophora floribunda*	**Rough-barked Apple**	0.41	0.47	4.92	2.41	Moderate	Remove
379	*Angophora floribunda*	**Rough-barked Apple**	0.46	0.48	5.52	2.43	Moderate	Remove
380	*Angophora floribunda*	**Rough-barked Apple**	0.42	0.44	5.04	2.34	Moderate	Remove
381	*Angophora floribunda*	**Rough-barked Apple**	0.38	0.53	4.56	2.53	Moderate	Remove
388	*Araucaria bidwillii*	**Bunya Pine**	0.48	0.62	5.76	2.71	High	Remove
389	*Araucaria bidwillii*	**Bunya Pine**	0.39	0.56	4.68	2.59	High	Remove
390	*Araucaria bidwillii*	**Bunya Pine**	0.38	0.49	4.56	2.45	High	Remove
391	*Araucaria bidwillii*	**Bunya Pine**	0.57	0.57	6.84	2.61	High	Remove
392	*Araucaria bidwillii*	**Bunya Pine**	0.47	0.52	5.64	2.51	Moderate	Retain
393	*Araucaria bidwillii*	**Bunya Pine**	0.37	0.51	4.44	2.49	High	Retain
394	*Araucaria bidwillii*	**Bunya Pine**	0.44	0.58	5.28	2.63	High	Retain
396	*Corymbia maculata*	**Spotted Gum**	0.43	0.52	5.16	2.51	High	Remove
397	*Corymbia maculata*	**Spotted Gum**	0.33	0.41	3.96	2.28	High	Remove
398	*Corymbia maculata*	**Spotted Gum**	0.46	0.58	5.52	2.63	High	Remove
399	*Melaleuca linariifolia*	**Flax Leaved Paperbark**	0.28	0.29	3.36	1.97	Moderate	Remove

ARTERRA DESIGN PTY LTD ABN 40 069 552 610
SUITE 602 / 51 RAWSON STREET, EPPING, NSW 2121
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0 5 10 30m

REVISION	DESCRIPTION	CHKD	DATE
P1	[Draft] Authority Submission	RWS	22/02/21

PROJECT & CLIENT
Blacktown ICTE - Athletes Accommodation
Blacktown City Council

Project No : 20.30
Designed : RWS
Drawn : RWS/CS/CB
North Scale : 1:300@A1/1:600@A3

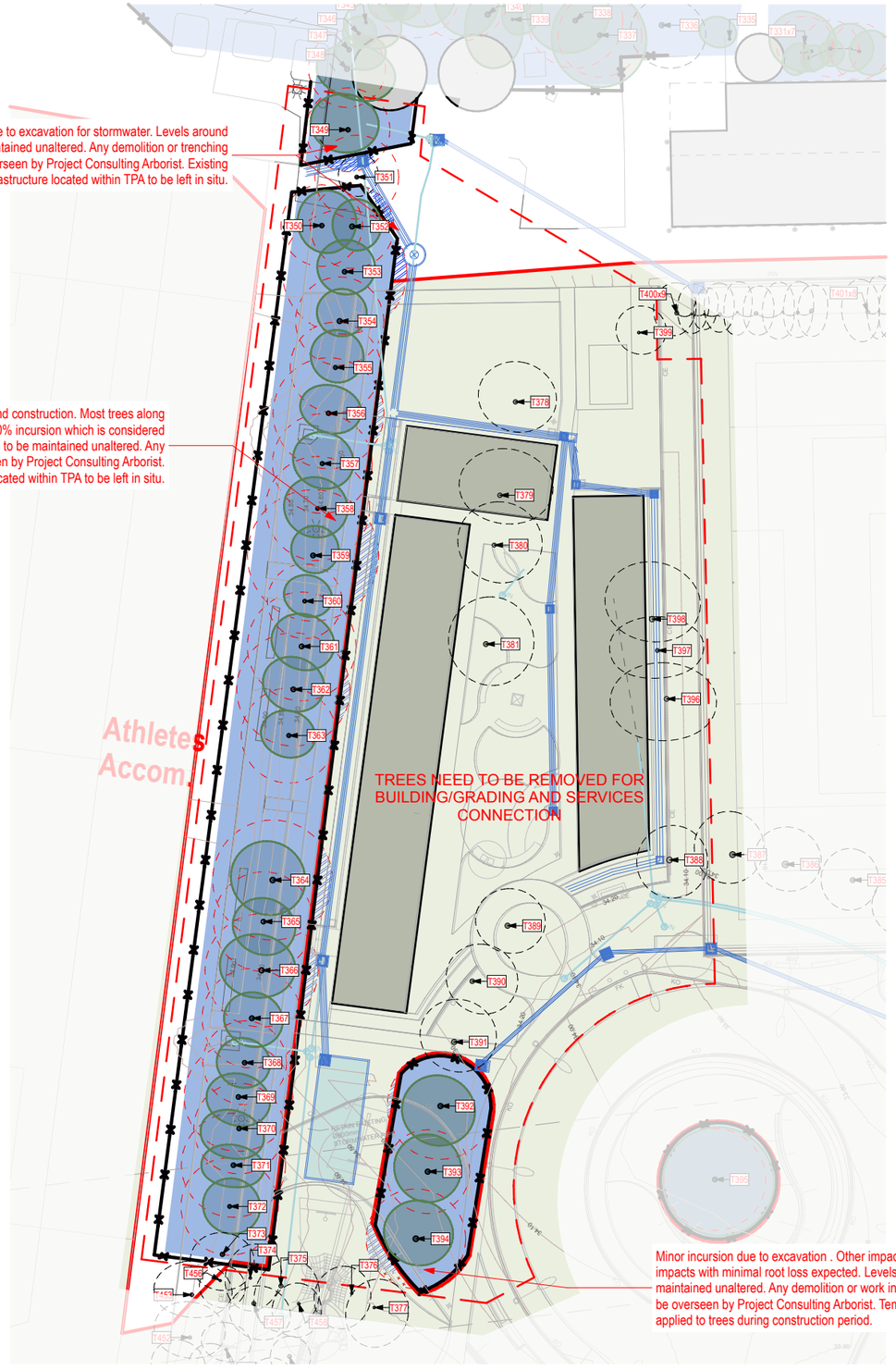
DRAWING TITLE
Tree Retention Value Plan

DRAWING NUMBER
TAA-02

REVISION
P1

Plotted at : 2:38 pm 22/2/21

4.2 TAA-03 - Tree Protection and Removal Plan



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)
- 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 retained
- Extent of ground modification and disturbance
- Extent of tree assessment study area

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.

Blacktown International Sport Centre - ICTE, Rooty Hill, NSW - Atheltes Accommodation DA - Tree Assessment Schedule

Tree ID	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
349	*Eucalyptus amplifolia*	**Cabbage Gum**	0.37	0.44	4.44	2.34	Moderate	Retain
350	*Eucalyptus sideroxylon*	**Mugga Ironbark**	0.36	0.44	4.32	2.34	Moderate	Retain
351	*Melaleuca linariifolia*	**Flax Leaved Paperbark**	0.37	0.44	4.44	2.34	Moderate	Remove
352	*Melaleuca linariifolia*	**Flax Leaved Paperbark**	0.37	0.50	4.44	2.47	Moderate	Retain
353	*Melaleuca linariifolia*	**Flax Leaved Paperbark**	0.55	0.46	6.60	2.39	Moderate	Retain
354	*Melaleuca linariifolia*	**Flax Leaved Paperbark**	0.39	0.50	4.68	2.47	Moderate	Retain
355	*Melaleuca linariifolia*	**Flax Leaved Paperbark**	0.40	0.40	4.80	2.25	Moderate	Retain
356	*Melaleuca linariifolia*	**Flax Leaved Paperbark**	0.49	0.44	5.88	2.34	Moderate	Retain
357	*Melaleuca linariifolia*	**Flax Leaved Paperbark**	0.44	0.40	5.28	2.25	Moderate	Retain
358	*Melaleuca linariifolia*	**Flax Leaved Paperbark**	0.46	0.35	5.52	2.13	Moderate	Retain
359	*Melaleuca linariifolia*	**Flax Leaved Paperbark**	0.58	0.47	6.96	2.41	Moderate	Retain
360	*Melaleuca linariifolia*	**Flax Leaved Paperbark**	0.33	0.36	3.96	2.15	Moderate	Retain
361	*Melaleuca linariifolia*	**Flax Leaved Paperbark**	0.48	0.48	5.76	2.43	Moderate	Retain
362	*Melaleuca linariifolia*	**Flax Leaved Paperbark**	0.50	0.47	6.00	2.41	Moderate	Retain
363	*Melaleuca linariifolia*	**Flax Leaved Paperbark**	0.42	0.40	5.04	2.25	Moderate	Retain
364	*Melaleuca linariifolia*	**Flax Leaved Paperbark**	0.53	0.56	6.36	2.59	Moderate	Retain
365	*Melaleuca linariifolia*	**Flax Leaved Paperbark**	0.44	0.45	5.28	2.37	Moderate	Retain
366	*Melaleuca linariifolia*	**Flax Leaved Paperbark**	0.50	0.52	6.00	2.51	Moderate	Retain
367	*Melaleuca linariifolia*	**Flax Leaved Paperbark**	0.44	0.49	5.28	2.45	Moderate	Retain
368	*Melaleuca linariifolia*	**Flax Leaved Paperbark**	0.37	0.43	4.44	2.32	Moderate	Retain
369	*Melaleuca linariifolia*	**Flax Leaved Paperbark**	0.48	0.45	5.76	2.37	Moderate	Retain
370	*Melaleuca linariifolia*	**Flax Leaved Paperbark**	0.40	0.44	4.80	2.34	Moderate	Retain
371	*Melaleuca linariifolia*	**Flax Leaved Paperbark**	0.46	0.46	5.52	2.39	Moderate	Retain
372	*Melaleuca linariifolia*	**Flax Leaved Paperbark**	0.43	0.37	5.16	2.18	Moderate	Retain
373	*Melaleuca linariifolia*	**Flax Leaved Paperbark**	0.38	0.41	4.56	2.28	Moderate	Remove
378	*Angophora floribunda*	**Rough-barked Apple**	0.41	0.47	4.92	2.41	Moderate	Remove
379	*Angophora floribunda*	**Rough-barked Apple**	0.46	0.48	5.52	2.43	Moderate	Remove
380	*Angophora floribunda*	**Rough-barked Apple**	0.42	0.44	5.04	2.34	Moderate	Remove
381	*Angophora floribunda*	**Rough-barked Apple**	0.38	0.53	4.56	2.53	Moderate	Remove
388	*Araucaria bidwillii*	**Bunya Pine**	0.48	0.62	5.76	2.71	High	Remove
389	*Araucaria bidwillii*	**Bunya Pine**	0.39	0.56	4.68	2.59	High	Remove
390	*Araucaria bidwillii*	**Bunya Pine**	0.38	0.49	4.56	2.45	High	Remove
391	*Araucaria bidwillii*	**Bunya Pine**	0.57	0.57	6.84	2.61	High	Remove
392	*Araucaria bidwillii*	**Bunya Pine**	0.47	0.52	5.64	2.51	Moderate	Retain
393	*Araucaria bidwillii*	**Bunya Pine**	0.37	0.51	4.44	2.49	High	Retain
394	*Araucaria bidwillii*	**Bunya Pine**	0.44	0.58	5.28	2.63	High	Retain
396	*Corymbia maculata*	**Spotted Gum**	0.43	0.52	5.16	2.51	High	Remove
397	*Corymbia maculata*	**Spotted Gum**	0.33	0.41	3.96	2.28	High	Remove
398	*Corymbia maculata*	**Spotted Gum**	0.46	0.58	5.52	2.63	High	Remove
399	*Melaleuca linariifolia*	**Flax Leaved Paperbark**	0.28	0.29	3.36	1.97	Moderate	Remove

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0 5 10 30m

REVISION	DESCRIPTION	CHKD	DATE
P1	[Draft] Authority Submission	RWS	22/02/21

PROJECT & CLIENT
Blacktown ICTE
Blacktown City Council

Project No : 20.30
Designed : RWS
Drawn : RWS/CS/CB
North Scale : 1:400@A1/1:800@A3

DRAWING TITLE
Tree Protection and Removal Plan

DRAWING NUMBER
TAA-03

REVISION
P1

Plotted at : 2:38 pm 22/2/21

4.3 Tree Impact Assessment Schedule

Blacktown International Sport Centre - ICTE, Rooty Hill, NSW - Atheltes Accommodation DA - Tree Assessment Schedule

Tree ID	Trees in Group	Tree Species	Common Name	Height (m)	Spread (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	Origin	Noted Defects	SULE Rating	Retention Value	General Comments and Notes	Incursion and Impact	Recommendation
349	1	*Eucalyptus amplifolia*	**Cabbage Gum**	12.0	5.0	0.37	0.44	4.44	2.34	Mature	Good	Average	Endemic	Major Wounding, Branch Tearouts	Long (>40 years)	**Moderate**	Major codominant trunk tear out at 3m to east.	Nil impact expected.	Retain
350	1	*Eucalyptus sideroxylon*	**Mugga Ironbark**	10.0	6.0	0.36	0.44	4.32	2.34	Mature	Good	Average	Endemic	Deadwood-Minor	Long (>40 years)	**Moderate**		Nil impact expected.	Retain
351	1	*Melaleuca linariifolia*	**Flax Leaved Paperbark**	6.5	4.0	0.37	0.44	4.44	2.34	Mature	Good	Average	Endemic		Long (>40 years)	**Moderate**		Major incursion due to excavations and trenhing for stormwater connections. Can not be retained.	Remove
352	1	*Melaleuca linariifolia*	**Flax Leaved Paperbark**	6.0	5.0	0.37	0.50	4.44	2.47	Mature	Good	Average	Endemic	Inclusions	Long (>40 years)	**Moderate**		Minor incursion to eastern side due building construction.	Retain
353	1	*Melaleuca linariifolia*	**Flax Leaved Paperbark**	7.0	5.0	0.55	0.46	6.60	2.39	Mature	Good	Average	Endemic	Inclusions	Long (>40 years)	**Moderate**		Minor incursion to eastern side due building construction.	Retain
354	1	*Melaleuca linariifolia*	**Flax Leaved Paperbark**	6.0	4.0	0.39	0.50	4.68	2.47	Mature	Good	Average	Endemic	Inclusions	Long (>40 years)	**Moderate**	Part of consistent row planting along car park/field edge.	Minor incursion to eastern side due building construction.	Retain
355	1	*Melaleuca linariifolia*	**Flax Leaved Paperbark**	6.0	5.0	0.40	0.40	4.80	2.25	Mature	Good	Average	Endemic	Inclusions	Long (>40 years)	**Moderate**	Part of consistent row planting along car park/field edge.	Minor incursion to eastern side due building construction.	Retain
356	1	*Melaleuca linariifolia*	**Flax Leaved Paperbark**	7.0	4.0	0.49	0.44	5.88	2.34	Mature	Good	Average	Endemic	Inclusions	Long (>40 years)	**Moderate**	Part of consistent row planting along car park/field edge.	Minor incursion to eastern side due building construction.	Retain
357	1	*Melaleuca linariifolia*	**Flax Leaved Paperbark**	6.0	5.0	0.44	0.40	5.28	2.25	Mature	Good	Average	Endemic	Inclusions	Long (>40 years)	**Moderate**	Part of consistent row planting along car park/field edge.	Minor incursion to eastern side due building construction.	Retain
358	1	*Melaleuca linariifolia*	**Flax Leaved Paperbark**	5.0	5.0	0.46	0.35	5.52	2.13	Mature	Good	Average	Endemic	Inclusions, Co-dominant Stems	Long (>40 years)	**Moderate**	Part of consistent row planting along car park/field edge.	Minor incursion to eastern side due building construction.	Retain
359	1	*Melaleuca linariifolia*	**Flax Leaved Paperbark**	5.5	5.0	0.58	0.47	6.96	2.41	Mature	Good	Average	Endemic	Inclusions	Long (>40 years)	**Moderate**	Part of consistent row planting along car park/field edge.	Minor incursion to eastern side due building construction.	Retain
360	1	*Melaleuca linariifolia*	**Flax Leaved Paperbark**	4.5	4.0	0.33	0.36	3.96	2.15	Mature	Good	Average	Endemic	Epicormic Growth	Long (>40 years)	**Moderate**	Part of consistent row planting along car park/field edge.	Minor incursion to eastern side due building construction.	Retain
361	1	*Melaleuca linariifolia*	**Flax Leaved Paperbark**	6.5	5.0	0.48	0.48	5.76	2.43	Mature	Good	Average	Endemic	Epicormic Growth	Long (>40 years)	**Moderate**	Part of consistent row planting along car park/field edge.	Minor incursion to eastern side due building construction.	Retain
362	1	*Melaleuca linariifolia*	**Flax Leaved Paperbark**	6.0	4.0	0.50	0.47	6.00	2.41	Mature	Good	Average	Endemic	Inclusions, Epicormic Growth	Long (>40 years)	**Moderate**	Part of consistent row planting along car park/field edge.	Minor incursion to eastern side due building construction.	Retain
363	1	*Melaleuca linariifolia*	**Flax Leaved Paperbark**	5.5	4.0	0.42	0.40	5.04	2.25	Mature	Good	Average	Endemic	Epicormic Growth	Long (>40 years)	**Moderate**	Part of consistent row planting along car park/field edge.	Minor incursion to eastern side due building construction.	Retain
364	1	*Melaleuca linariifolia*	**Flax Leaved Paperbark**	6.5	5.0	0.53	0.56	6.36	2.59	Mature	Good	Average	Endemic	Inclusions	Long (>40 years)	**Moderate**	Part of consistent row planting along car park/field edge.	Minor incursion to eastern side due building construction.	Retain
365	1	*Melaleuca linariifolia*	**Flax Leaved Paperbark**	6.0	4.0	0.44	0.45	5.28	2.37	Mature	Good	Average	Endemic	Co-dominant Stems, Inclusions	Long (>40 years)	**Moderate**	Part of consistent row planting along car park/field edge.	Minor incursion to eastern side due building construction.	Retain
366	1	*Melaleuca linariifolia*	**Flax Leaved Paperbark**	6.0	5.0	0.50	0.52	6.00	2.51	Mature	Good	Average	Endemic	Co-dominant Stems, Congested Branches, Inclusions	Long (>40 years)	**Moderate**	Part of consistent row planting along car park/field edge.	Minor incursion to eastern side due building construction.	Retain
367	1	*Melaleuca linariifolia*	**Flax Leaved Paperbark**	5.0	5.0	0.44	0.49	5.28	2.45	Mature	Good	Average	Endemic	Co-dominant Stems	Long (>40 years)	**Moderate**	Part of consistent row planting along car park/field edge.	Minor incursion to eastern side due building construction.	Retain
368	1	*Melaleuca linariifolia*	**Flax Leaved Paperbark**	4.5	4.0	0.37	0.43	4.44	2.32	Mature	Good	Average	Endemic	Inclusions	Long (>40 years)	**Moderate**	Part of consistent row planting along car park/field edge.	Minor incursion to eastern side due building construction.	Retain
369	1	*Melaleuca linariifolia*	**Flax Leaved Paperbark**	4.0	4.0	0.48	0.45	5.76	2.37	Mature	Good	Average	Endemic	Inclusions, Congested Branches	Long (>40 years)	**Moderate**	Part of consistent row planting along car park/field edge.	Minor incursion to eastern side due building construction.	Retain
370	1	*Melaleuca linariifolia*	**Flax Leaved Paperbark**	4.5	5.0	0.40	0.44	4.80	2.34	Mature	Good	Average	Endemic	Inclusions, Deadwood-Minor	Long (>40 years)	**Moderate**	Part of consistent row planting along car park/field edge.	Minor incursion to eastern side due building construction.	Retain
371	1	*Melaleuca linariifolia*	**Flax Leaved Paperbark**	4.5	5.0	0.46	0.46	5.52	2.39	Mature	Good	Average	Endemic	Co-dominant Stems, Inclusions	Long (>40 years)	**Moderate**	Part of consistent row planting along car park/field edge.	Minor incursion to eastern side due building construction.	Retain
372	1	*Melaleuca linariifolia*	**Flax Leaved Paperbark**	5.0	5.0	0.43	0.37	5.16	2.18	Mature	Good	Average	Endemic	Epicormic Growth, Co-dominant Stems, Inclusions	Long (>40 years)	**Moderate**	Part of consistent row planting along car park/field edge.	Minor incursion to eastern side due building construction.	Retain
373	1	*Melaleuca linariifolia*	**Flax Leaved Paperbark**	4.5	4.0	0.38	0.41	4.56	2.28	Mature	Good	Average	Endemic	Inclusions	Long (>40 years)	**Moderate**	Part of consistent row planting along car park/field edge.	Closely adjoining work and grading zone. Significant impact expected and required to be removed for construction access aorund new building and playground	Remove
378	1	*Angophora floribunda*	**Rough-barked Apple**	12.0	5.0	0.41	0.47	4.92	2.41	Mature	Good	Average	Endemic		Long (>40 years)	**Moderate**		Within work and grading zone. Cannot be retained.	Remove
379	1	*Angophora floribunda*	**Rough-barked Apple**	11.0	7.0	0.46	0.48	5.52	2.43	Mature	Good	Average	Endemic	Tip Dieback	Long (>40 years)	**Moderate**		Within work and grading zone. Cannot be retained.	Remove
380	1	*Angophora floribunda*	**Rough-barked Apple**	11.5	7.0	0.42	0.44	5.04	2.34	Mature	Good	Average	Endemic		Long (>40 years)	**Moderate**		Within work and grading zone. Cannot be retained.	Remove
381	1	*Angophora floribunda*	**Rough-barked Apple**	11.0	6.0	0.38	0.53	4.56	2.53	Mature	Good	Average	Endemic		Long (>40 years)	**Moderate**		Within work and grading zone. Cannot be retained.	Remove
388	1	*Araucaria bidwillii*	**Bunya Pine**	9.0	6.0	0.48	0.62	5.76	2.71	Mature	Excellent	Excellent	Native		Long (>40 years)	**High**		Within work and grading zone. Cannot be retained.	Remove
389	1	*Araucaria bidwillii*	**Bunya Pine**	8.0	6.0	0.39	0.56	4.68	2.59	Mature	Excellent	Excellent	Native		Long (>40 years)	**High**		Within work and grading zone. Cannot be retained.	Remove
390	1	*Araucaria bidwillii*	**Bunya Pine**	8.0	6.0	0.38	0.49	4.56	2.45	Mature	Excellent	Excellent	Native		Long (>40 years)	**High**		Within work and grading zone. Cannot be retained.	Remove
391	1	*Araucaria bidwillii*	**Bunya Pine**	9.0	6.0	0.57	0.57	6.84	2.61	Mature	Excellent	Excellent	Native		Long (>40 years)	**High**		Within work and grading zone. Cannot be retained.	Remove
392	1	*Araucaria bidwillii*	**Bunya Pine**	8.0	6.0	0.47	0.52	5.64	2.51	Mature	Excellent	Average	Native	Co-dominant Stems, Inclusions	Long (>40 years)	**Moderate**	Bifurcated trunk at 1.5m	Minor incursion due to surrounding landscape and grade changes. Fence and protect ground levels around tree.	Retain
393	1	*Araucaria bidwillii*	**Bunya Pine**	8.5	6.0	0.37	0.51	4.44	2.49	Mature	Good	Average	Native		Long (>40 years)	**High**		Minor incursion due to surrounding landscape and grade changes. Fence and protect ground levels around tree.	Retain
394	1	*Araucaria bidwillii*	**Bunya Pine**	8.5	6.0	0.44	0.58	5.28	2.63	Mature	Excellent	Excellent	Native		Long (>40 years)	**High**		Minor incursion due to surrounding landscape and grade changes. Fence and protect ground levels around tree.	Retain
396	1	*Corymbia maculata*	**Spotted Gum**	15.0	8.0	0.43	0.52	5.16	2.51	Mature	Good	Excellent	Endemic		Long (>40 years)	**High**		Within work and grading zone. Cannot be retained.	Remove
397	1	*Corymbia maculata*	**Spotted Gum**	14.5	6.0	0.33	0.41	3.96	2.28	Mature	Good	Excellent	Endemic		Long (>40 years)	**High**		Within work and grading zone. Cannot be retained.	Remove
398	1	*Corymbia maculata*	**Spotted Gum**	15.5	7.0	0.46	0.58	5.52	2.63	Mature	Good	Excellent	Endemic		Long (>40 years)	**High**		Within work and grading zone. Cannot be retained.	Remove
399	1	*Melaleuca linariifolia*	**Flax Leaved Paperbark**	5.5	5.0	0.28	0.29	3.36	1.97	Mature	Good	Average	Endemic	Co-dominant Stems, Inclusions, Deadwood-Minor	Long (>40 years)	**Moderate**		Within work and grading zone. Cannot be retained.	Remove