ARBORICULTURAL IMPACT ASSESSMENT REPORT

SITE ADDRESS	W6A and W6B Arts Precinct, Macquarie University
CLIENT	Macquarie University
REPORT PREPARED BY	Australian Tree Consultants Pty Ltd
DATE	18 April 2017

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1. INTRODUCTION /METHODOLOGY

Mr Frank Tong, on behalf of Macquarie University, has commissioned Australian Tree Consultants Pty Ltd to provide a report on the trees located within and immediately adjacent to the buildings identified as W6A and W6B, Arts Precinct, Macquarie University, Macquarie Park (NSW).

Only those plants which qualify as a 'tree' under the provisions of the relevant local government authority's tree management policy have been included in this report. Details of other plantings may be provided where such detail is considered appropriate or relevant. Where 'trees' have been identified on site but do not appear on the provided survey plan, indicative locations have been provided in Appendix 4 of this report.

A Visual Tree Assessment (VTA) was conducted from ground level employing techniques developed by Mattheck, Claus and et al. Principle explanations and illustrations are contained within the publication, *The Body Language of Trees* by Mattheck, C (1994). No aerial inspections or root mapping was undertaken. Tree heights and canopy spreads were visually estimated. Unless otherwise stated, Diameter at Breast Height (DBH), indicated using the mathematical symbol for diameter, was measured using a diameter tape and taken at 1.4 meters above existing ground level. The Diameter at Base is measured in accordance with the provisions of AS4970-2009. Where a variation to this occurs, the height at which the measurement was taken is shown with the relevant figure.

Structural Root Zones and Tree Protection Zones were calculated using the Australian Standard 4970 - Protection of Trees on Development Sites, 2009. Where a diameter measurement is not available, the Structural Root Zone or Tree Protection Zone is calculated using the relevant AS formula and the available measurements, either the Diameter at Breast Height or Diameter at Base. Tree Protection Zone calculations which fall below the minimum radial distance permitted under the provisions of AS4970-2009 (ie. 2 metres) have been amended to reflect the minimum radial distance indicated by the standard.

All pruning specifications are written in compliance of, and should be carried out in accordance with, Australian Standard 4373, Pruning of Amenity Trees, 2007 and Safe Work Australia, 'Guide to Managing Risks of Tree Trimming and Removal Work', 2016. Definitions for all terminology used in this report are taken from AS4373 – Pruning of amenity trees, 2007, AS4970-Protection of trees on development sites, 2009 and the International Society of Arboriculture's *Glossary of Arboricultural Terms*.

2. AIM

The trees were inspected on Wednesday, 29 March 2017. The aim of the inspection was to;

a) identify all relevant trees,
b) assess their health and structural condition and
c) make comment with regard to the potential impact of the proposed development works within the area.

3. THE PROPOSAL

The proposed development works involve;

a) Replacement of the existing building facades to Buildings W6A and W6B,

b) Alterations and additions to the existing Buildings W6A and W6B and

c) Construction of a new, multi-storey, building to the south of W6A.

The following documents and plans were referenced in preparation of this report:

- Part Survey Plan, no plan identification, date or details provided on document,
- W6A and W6B Buildings Ground Floor Plan, Plan No. CP/3 01 Revision D, prepared by Budden Nangle Michael and Hudson Architects, undated,
- W6A and W6B Buildings 1st Floor Plan, Plan No. CP/3 02 Revision D, prepared by Budden Nangle Michael and Hudson Architects, undated,
- W6A and W6B Buildings 2nd Floor Plan, Plan No. CP/3 03 Revision D, prepared by Budden Nangle Michael and Hudson Architects, undated,
- W6A and W6B Buildings 3rd Floor Plan, Plan No. CP/3 04 Revision D, prepared by Budden Nangle Michael and Hudson Architects, undated,
- W6A and W6B Buildings 4th Floor Plan, Plan No. CP/3 05 Revision C, prepared by Budden Nangle Michael and Hudson Architects, undated,
- W6A and W6B Buildings 5th Floor Plan, Plan No. CP/3 06 Revision C, prepared by Budden Nangle Michael and Hudson Architects, undated,
- W6A and W6B Buildings Level 6 to 8 (Floor) Plan, Plan No. CP/3 07 Revision B, prepared by Budden Nangle Michael and Hudson Architects, undated,
- North Elevation and Section, Plan No. CP/3 08 Revision B, prepared by Budden Nangle Michael and Hudson Architects, undated,
- South Elevations, Plan No. CP/3 09 Revision B, prepared by Budden Nangle Michael and Hudson Architects, undated,
- East and West Elevation, Plan No. CP/3 10 Revision B, prepared by Budden Nangle Michael and Hudson Architects, undated,

***NB**: No details regarding the proposed stormwater and drainage design or landscape design have been provided and therefore, an assessment of their impact upon identified trees does not form part of this report.*

4. OBSERVATIONS

4.1 Tree Identification and Assessment

For details, please refer to Appendix 2: Tree Schedule, located on page 19 of this report.

4.2 Legislative and Planning Considerations

The Macquarie University site is not directly subject to the City of Ryde Local Environment Plan (LEP) 2014 or Development Control Plan (DCP) 2014 however, these documents may contain some details which are relevant considerations.

Planning Control	Relevant	Not Relevant
Zoning	B4- Mixed Use	
Acid Sulfate Soils	N/A	
Heritage Listed Site	✓	
Heritage Conservation Area		✕
Foreshore Building Line		✕
Flood Prone Land		✕
Bush Fire Prone Land • Partial but not within identified zone of works.		✕
10/50 Vegetation Clearing Entitlement Area • Land identified within a designated 10/50 vegetation entitlement clearing area however, exclusions and restrictions apply.		✕

5. DISCUSSION

5.1 The Site

The subject area of proposed works forms part of the Macquarie University 'site' and is wholly contained within the grounds of the university. Specifically, the area is buildings identified as W6A and W6B within the Arts Precinct.

The subject buildings are constructed in a combination of the stripped classical and brutalist architectural styles typical of the late 1960's and early 1970's. The associated garden plantings are predominantly specimen plantings of either native Australian species trees or imported species that were fashionable at the time. No specific garden design or style is currently identifiable.

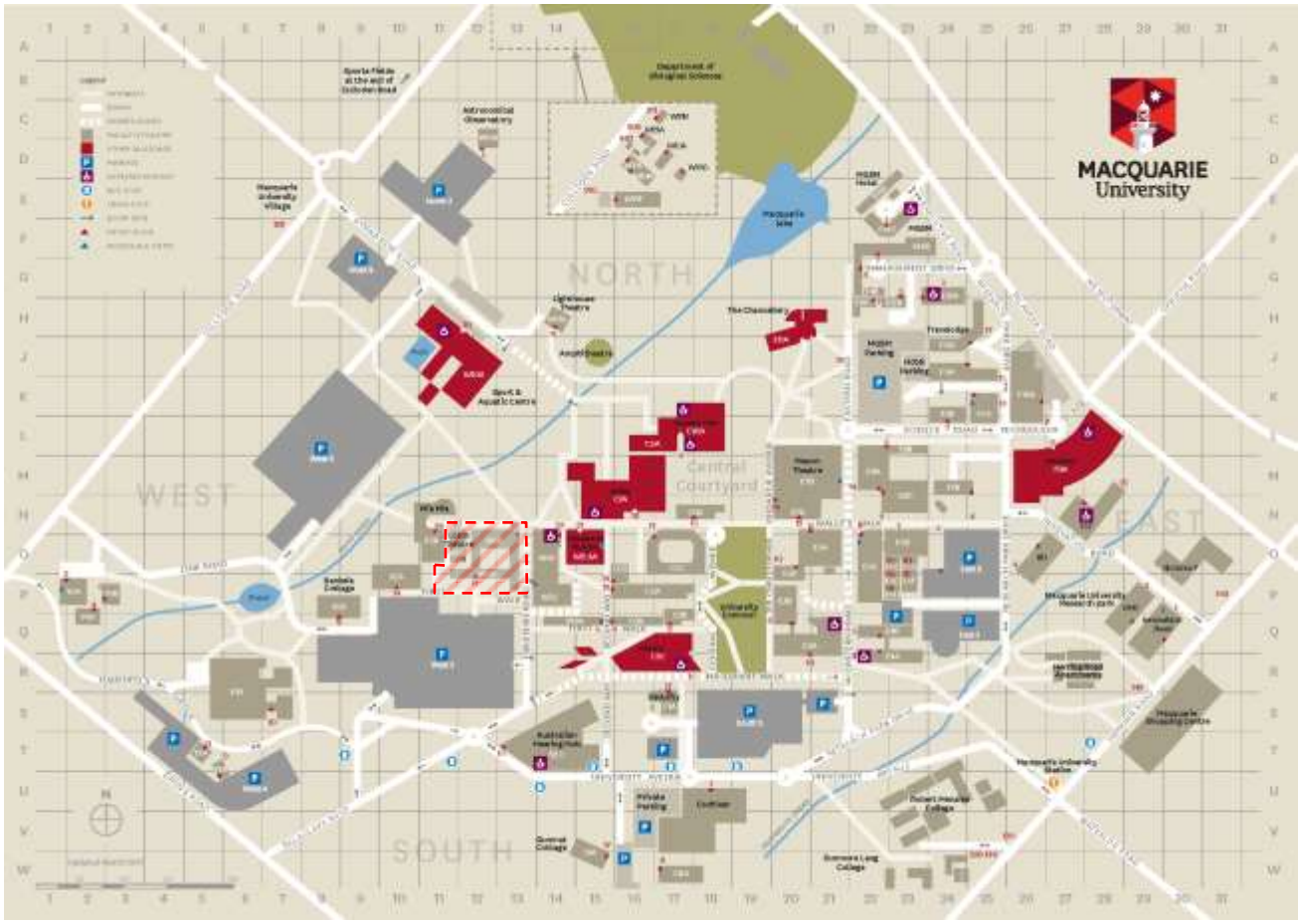
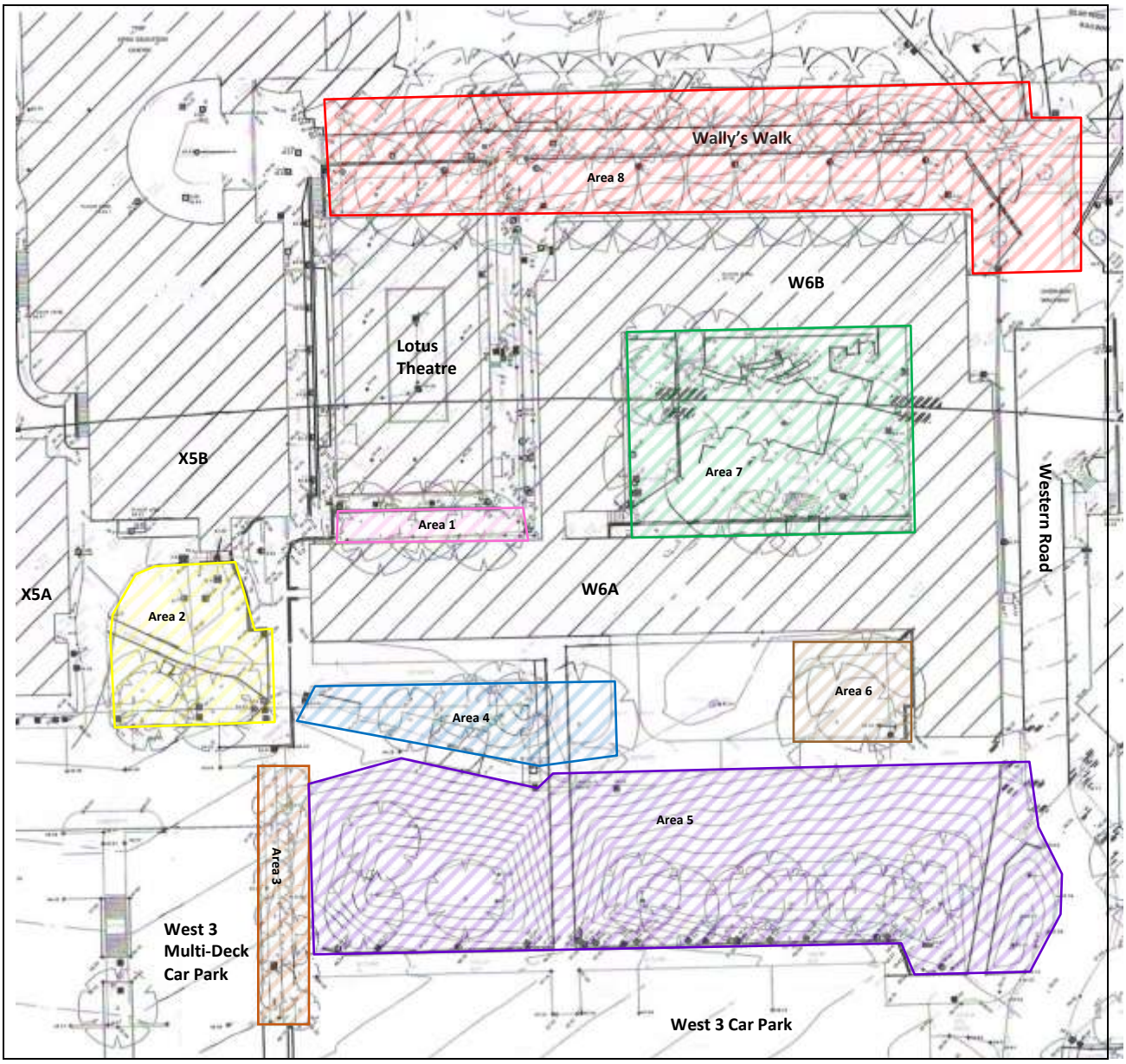


***Image 1**: Location of works site within Macquarie University grounds.*

5.2 Tree Groupings

Due to the nature of the existing plantings and the proposed works, this report will refer to relevant areas and blocks of trees. For ease of reference, these areas will be identified by their location. Image 2 below, details the location and designated title for each area discussed.



Key

- Area 1: W6A North Garden Bed
- Area 2: X5B Garden Grove Planting
- Area 3: West 3 Car Park Planting
- Area 4: W6A Garden Grove Planting
- Area 5: W6A Embankment Planting
- Area 6: W6A Garden Bed Planting
- Area 7: W6B Courtyard Planting
- Area 8: Wally's Walk Avenue Planting

5.3 Area 1: W6A Northern Garden Bed

This planting consists of six (6) Flooded Gums (*Eucalyptus grandis*), given the identification numbers of Trees 771 to 776 in the data set. The trees are planted within a raised garden bed, of approximately 2.5 metres in width, immediately adjacent to the northern façade of W6A. Due to the nature of the garden bed there is a finite soil volume available to the trees, a volume which is insufficient to ensure their long-term sustainability and viability. As the species has the genetic capacity to grow to dimensions of up to 45-55 metres in height and with diameters at breast height of 1.2 to 2 metres, their installation in this location is considered inappropriate for long term retention. As the trees continue to grow, so will their requirements for both nutrients and moisture. It is unlikely that the restrictive soil volume afforded to these trees will be able to supply their needs. As a result, natural selection will cause the death of weaker or subordinate specimens whilst the health and vigour of the remaining specimens will slowly decline.

One specific tree, identified as Tree 776, was noted to have a fungal fruiting body on the trunk. The fruiting body was identified as belonging to a *Phellinus* spp. fungi. The *Phellinus* spp. fungi are considered a white rot fungi as they preferentially degrade the lignin within wood cells. This results in the affected wood being brittle and having decreased structural strength. As the area of altered wood within a tree increases, so does its risk of whole tree failure. Anecdotal evidence suggests that, generally speaking, *Eucalyptus grandis* has a reasonable capacity to compartmentalise pathogenic infections. Testing using Sonic Tomography would however, be required to ascertain the extent of the existing infection, its implications for the structural integrity of this tree and connotations for the associated management of the tree. As this specific tree is located in an area where there have already been other stress factors identified, its individual capacity to divert resources and energy to the process of compartmentalisation would be reduced. With one of these identified stress factors being overcrowding, that is an excessive number of trees drawing resources from a finite and inadequate volume of soil, the removal of this tree, regardless of the pathogenic infection or development impacts, could be the most appropriate management action.

The proximity of the trees to the building has caused them to be extensively, and excessively, crown lifted. This has resulted in the trees having poor form for their species. Their proximity to each other has also resulted in the remaining canopies coming into conflict with each other and causing a number of abrasion wounds on branches. These wounds are likely sites for pathogenic infection and the development of decay. They also increase risks of failure by weakening the structure of the actual branch and its ability to withstand wind forces acting on individual branches.

It is presumed, from their location, that the trees were initially planted to provide some shading from the hot northerly sun to this side of the building. This inference is supported by the selection of the species which is noted to naturally grow relatively straight and tall. Unfortunately, there is insufficient space within this growing environment, either for their roots or canopies, to develop to their full potential. The planting, regardless of any proposed development work, has a limited useful life span with the trees potentially at their optimal health and size condition now. It is believed that this inappropriate planting will, in the near future, enter into a cycle of decline that will, ultimately, require their removal.

Construction Impact

With regard to the proposed development works, the proximity of these trees to the building and the restricted area in which they are planted, present a number of practical issues. It is understood that scaffolding will be required to be installed on all sides of the building to facilitate removal of the existing façade and replacement with the new. This will bring the bulk of the scaffolding into conflict with the trunks of the trees.

This creates a number of points of conflict between the trees and the scaffolding. In the first instance, the weight of the scaffolding will create excessive compaction of the soil surrounding the subject trees. Soil compaction destroys the structure of the soil and reduces the pore spaces within it. This limits the water and air holding capacity of the soil. With both air and moisture required for root growth and survival, compaction ultimately results in root death. The effect of this on the tree is a reduction in its health and vigour.

Although load spreading devices are available to assist in minimising this type of negative impact on the soil, their practicality in this instance is considered to be low. The limited space within the garden bed restricts the area available for the installation of load spreading devices. Similarly, the proximity of the trees to each other provides further limitations to the use of such devices.

Whilst it may, under the guidance of an engineer, be possible to use the actual retaining wall along the northern edge of the garden as a support for the scaffolding, there is no appropriate structure on the opposing southern, or building, side of the garden bed. In addition to the direct impact of the weight of the scaffolding, the negative impact caused by the restriction of material covering the soil must also be taken into account. Even if the installation of load spreading devices were possible, they themselves would further reduce the effective catchment area of the trees by physically reducing water and air exchange to the soil, again, negatively impacting on the trees health and vigour.

A second issue associated with the installation of scaffolding in this area whilst retaining the subject trees is the bulk and scale of the scaffolding itself. The limited area of the garden bed, the proximity of the trees to the building and the crowded nature of the trees in relation to each other all severely limit the accessible space for the installation of scaffolding. Work health and safety requirements, in regard to the manner of scaffolding construction, limit the flexibility of its actual structural design and installation. With little variation available to the style of scaffolding used, and the manner in which it is erected, there will be conflict between the trunks of the trees and the scaffolding itself. This conflict is likely to cause wounding of the trees exposing them to pathogenic infection. Under alternative circumstances, trunk and branch protection may be installed to protect trees from such damage. In this instance however, given the size of the trees, the extended period over which the works are likely to take place and the extensive nature of the required protections, this option is considered to be unviable.

Taking into consideration the overall general condition of these trees, their lack of long term viability and sustainability and the impracticalities of installing scaffolding whilst providing adequate and appropriate protection to them, it is recommended that these trees be removed and replaced, with a more appropriate planting at the completion of the works.

5.4 Area 2: X5B Garden Grove Planting

This group of sixteen (16) trees consists of a mixture of Grey Gum (*Eucalyptus punctata*) and Spotted Gums (*Corymbia maculata*). They have been identified as being Trees 777 to 792 within the data set. The trees are all semi-mature to mature specimens and were possibly planted as part of the original garden design associated with the construction of the X5A and X5B buildings. The trees are located within a garden bed both defined and bisected by pedestrian pathways. As is typical of a grove planting such as this, some specimens have dominated whilst others are subordinate. At the time of inspection, there were no significant arboricultural issues of note.

Construction Impact

As previously discussed, the area in which these trees are planted is defined by pedestrian pathways. The pathway to the east, between it and Building W6A, is a relatively wide pathway. This forms a natural barrier between the trees and the area where construction works are being proposed. Work health and safety requirements necessitate the fencing of construction sites. An additional benefit of this sort of 'boundary' fencing is, in this instance, to provide practical tree protection to these trees. Installation of temporary fencing panels along the eastern edge of the pathway will not only isolate the construction zone, thereby complying with work health and safety requirements, but also provide practical tree protection to these trees. Such a fence would provide a physical separation from the works limiting the risk of potential damage. Installation of temporary fencing, in the stated location, would also permit the pathway to remain open allowing pedestrians to access other buildings such as the Lotus Theatre and X5B.

5.5 Area 3: West 3 Car Park Planting

These fifteen (15) trees, identified as Trees 793 to 807 in the data set, form an avenue planting along the pedestrian pathway between the multi-deck section of the West 3 car park and the mounds across the front of Building W6A. It is apparent that they were planted as part of the original car park design given that the same species has been planted throughout the West 3 car park. All of the subject trees are stunted in their growth. This is mainly due to a combination of their limited effective catchment areas, competition from surrounding trees and the microclimate of the particular location.

Tree 803 appears to be a replacement planting, being considerably younger and smaller than the other trees. This specimen was noted to have poor form and to have been vandalised with a number of primary branches having been broken within the crown. Due to its small size this tree was not tagged.

As a planting, these trees will never attain their full potential. The trees on the western side of the pathway have a very restricted effective catchment due to the proximity of the bitumen car park to their west and the concrete footpath to their east. Trees on the eastern side of the pathway fair better as they have been able to expand their root plates into the embankment area. Given the restrictive nature of the environment, it is considered likely that the only reason these trees have done as well as they have is because of the topography of the surrounding area. Having the embankment to the east of the trees has resulted in a proportion

of water moving over and through the soil toward these trees. Regardless of any proposed development, it is believed that their overall situation is such that the planting should be considered only a short-term planting in respect of its viability and sustainability.

Construction Impact

As the proposed works involve the removal of the earthen mound to the east of these trees and construction of a new building, it is believed that it is unlikely and inappropriate to retain these trees. Bulk earth works to remove the earth mound will negatively impact on the root systems of these trees. In particular, those trees on the eastern side of the existing footpath would sustain significant levels of damage liable to render them unstable. In addition, the variation to the site will result in an altered microclimate that will negatively impact on the trees. As previously discussed, the existing topography of the area has provided additional moisture to the trees. Alteration to soil levels etc. will also alter the movement of water through and over the soil, reducing the levels available to these trees. This, in combination with the increased temperatures and reduced levels of light created by the bulk and scale of the proposed new museum building, make retention of these trees, as part of the development, inappropriate.

5.6 Area 4: W6A Garden Grove Planting

This grouping of Lemon Scented Gums (*Corymbia citriodora*), located outside of W6A, has been identified in the data set as being Trees 808 to 813. With the exception of Tree 808, the trees are located in a small, roughly triangular garden area defined by pedestrian pathways at each side. Areas of seating, in the form of fixed tables and seats, have been installed within the grove. The trees are generally in good health and have good structure. At the time of inspection, no significant matters of arboricultural concern were noted.

Construction Impact

These trees fall within the footprint of the proposed redevelopment and, specifically, within the proposed pedestrian walkway and atrium area. Bulk earthworks required for construction of the proposed new building to the south of W6A would be within the Tree Protection Zones of most of these trees and likely the Structural Root Zones of some of the larger ones, particularly Tree 808. To provide protection to these trees, adequate to allow for their retention, a significant area of the proposed development zone would be required to be isolated. This would create logistical issues that will add to the cost and time associate with construction works.

In addition to this, should the trees be retained and protected during construction, the significant alteration to their growing environment will have long term negative effects on their health and vigour. Installation of new paving will limit the exchange of air and moisture to the soil surrounding the trees, there will be alterations to the microclimate resulting from the additional bulk of new structures, the atrium roof will prevent rain permeating the soil and wind force patterns will be altered by the various structures and forms surrounding the trees. Given that this particular species grows quite quickly, compensatory plantings in appropriate locations on the campus would replace the canopy lost by removal of these trees within a

relatively short time frame. Such plantings would also provide a more viable and sustainable long term environmental benefit than would be achieved by the retention of these trees.

5.7 Area 5: W6A Embankment Planting

This planting consists of trees, identified within the data set as Trees 816 to 849. They primarily consist of a mixed planting of Box Elder (*Acer negundo*) and Flowering Cherry Plums (*Prunus blireana*). The general condition of all of these trees is relatively poor and their overall 'value' in regard to the environment is questionable. Although a fashionable planting in the 1970's, Box Elder (*Acer negundo*) as a species is generally considered 'undesirable' today. This is due to its propensity to self-seed. In some areas of Sydney it has been declared an environmental weed. Other species in the area, including the Flowering Cherry Plums (*Prunus blireana*) and the Golden Robinia (*Robinia pseudoacacia* 'Frisia') are also considered to have low retention values and/or problematic genetic traits.

Most of the Box Elder (*Acer negundo*) have been poorly pruned in the past with almost all having visible cavities and areas of decay within their canopies and trunks. Numerous failures are also evident in the canopies of these trees. The Flowering Cherry Plums (*Prunus blireana*) have generally poor form and have failed to achieve their full potential. Overall, it could be said that this planting is generally in decline and will, eventually, require removal.

The steep incline of the area however, makes it a relatively inaccessible area. As such, the majority of these trees pose little risk to persons or property and could be retained for quite some time. Certainly, they could be retained until such time as they 'fell apart'.

Construction Impact

As it is proposed to remove this mound to construct a new building, these trees would all require removal should the proposed works be carried out as indicated on supplied plans.

5.8 Area 6: W6A Garden Bed Planting

This planting consists of the two (2) mature, Hills Weeping Figs (*Ficus microcarpa* var. *hillii*) located toward the south-eastern corner of W6A. They have been designated Trees 814 and 815 in the data set. Both trees branch low down on their trunks, a form typical for the species. The canopies of both trees have been modified slightly to provide clearance to the existing building although branches are still in very close proximity to the building. Due to their species, both are considered to have habitat value to the local environment. At the time of the inspection, a Brush Turkey nest was noted to the north-west of these trees. Whilst it did not appear to be currently active, it would be advisable to clarify its status immediately prior to any works within the area.

Construction Impact

Supplied plans seem to indicate intent to retain these two (2) trees. Assessment of the plans as provided suggests that it would be unlikely that these trees could be retained if the proposed works proceed. Whilst no specific details regarding existing and proposed finished levels have

been provided, the plans do indicate stairs being constructed adjacent to the trees. It appears that these stairs facilitate a variation in level up, from the level of the new building, to the existing ground floor level of W6A. Measurements taken from the plans show that this level variation is proposed to be approximately 4 metres from the base of Tree 814 and approximately 9.5 metres from the base of Tree 815. This places the work within the calculated Tree Protection Zone for both trees. Further calculation shows that the encroachment represents a loss to Tree 814 of approximately 18% of the Tree Protection Zone and approximately 43% for Tree 815. With an encroachment of approximately 18% a tree could be retained however, encroaching into the Tree Protection Zone by approximately 43% is likely to result in the tree being unsustainable.

The impacts of this work must also be tempered with the associated works of altering the ground covering surrounding these trees and their general environmental conditions. The plans indicate that the trees, if retained, would be located within a primary pedestrian thoroughfare. This would require the surroundings of the trees, currently largely exposed soil, to be altered to a paved or solid surface. This change would have a negative impact on the health and vigour of the trees by reducing their effective catchment area and limiting the supply of air and moisture to the soil surrounding them. Given the species of the tree, one which is noted to have an extensive and dense root plate, there is likely to be conflict between any hard-paved surface and the root system of the trees. As the trees begin to adapt to the altered environmental conditions, they will develop more surface roots. In time, this can cause uplifting of paved surfaces. With no possibility of retro-fitting a terra cell system, or other infrastructure devices used to minimise this sort of disruption, ongoing and persistent damage from tree roots would occur to the paved surface.

The trees would also suffer negative effects resulting from the alterations to their immediate environmental conditions. Construction of a new building to their south along with the proposed atrium roofing will alter the climatic conditions of the trees. Reduced levels of light, altered wind patterns and varied temperatures will all be stressors to the trees manifesting in a reduction in health and vigour. The combination of the changes to the soil and these, resulting from construction works, could result in the trees entering a cycle of decline. Whilst they may be an appropriate planting at this time, and in the existing conditions, it is believed that they would be inappropriate to retain given the proposed works within their vicinity.

5.9 Area 7: W6B Courtyard Planting

The trees within this courtyard area have been designated Trees 850 to 865 in the data set. Generally, they are in fair to poor condition both in respect of health and structure. The exception to this is Tree 851 Broad-leafed Paperbark (*Melaleuca quinquenervia*). Located at the north-western corner of the courtyard, this tree is the best specimen within the area. Tree 852, also a Broad-leafed Paperbark (*Melaleuca quinquenervia*), is also a reasonable specimen although it is suffering the negative impact of being crowded by the other two (2) larger trees. The third Broad-leafed Paperbark (*Melaleuca quinquenervia*), Tree 853, was noted to have an included main stem junction. This is a structural defect where bark grows within the junction and can, under some circumstances and certain species, increase the risk of failure at that point. Broad-leafed Paperbark (*Melaleuca quinquenervia*) are one of the species where the presence of this anomaly is considered a structural defect. Several instances, where included junctions in this species have failed, are on record. Given that this area is heavily used by

people and that the pattern of that use is to be sedentary for extended periods of time, retention of this tree with the identified defect is not considered appropriate.

The remainder of the trees within the courtyard area are all considered to be of low retention value due to their general condition. Assessment of these trees clearly reveals the inadequacies and deficiencies in the initial design of the planting. As an example, the raised garden beds, found along the southern side of the courtyard are too small to adequately provide for the trees that were planted in them. The combination of restrictive space for the development of a root plate, limited soil volume, and therefore limited nutrient and moisture availability, all negatively impact on the health and structural integrity of the trees planted in this space. The result is trees of poor health and structure, which have limited viability and sustainability. Unfortunately, in the instance of this courtyard, the choice of species has not been supported by appropriate or adequate planting infrastructure and design resulting in the landscape having a very limited useful lifespan. Use of supportive infrastructure, appropriate construction techniques and quality design which adequately provides for the needs of the mature trees will result in a viable and sustainable landscape over the long term.

Construction Impact

Details of the proposed works within this area indicate that, at a minimum, Trees 854 to 865 would require removal as they are located within the identified footprint of the proposed development. As previously discussed, removal of Tree 853 is recommended regardless of any proposed development. Trees 851 and 852, indicated on supplied plans as being potentially retained, are unlikely to be viable for retention given the confined nature of the area in which they are located and the extent and proximity of works to the trees.

Supplied plans indicate the intent to construct ramps to the south and west of these trees. The plans show these ramps to be approximately 2 metres and 2.5 metres from the base of Tree 851. This places the proposed works within the trees Structural Root Zone, calculated as being 2.8 metres. Under the provisions of AS 4970-2009, construction within this zone is not recommended as the risk of damage to structurally supportive roots, resulting in destabilisation of the tree, is deemed to be high. For this reason, should the proposal be constructed as represented on the supplied plans, removal of this tree would be required.

Similarly, the plans indicate a ramp would be constructed along the western side of Tree 852. Measurements from those plans indicate that the ramp would be approximately 1 metre from the base of the tree. Additionally, the proposed platform is shown to be located approximately 1.5 metres to the south of the same tree. Either instance of proposed work, in isolation, is sufficient to warrant a recommendation to remove this tree. Given the extent of intended works, retention of this tree is not viable should the development proceed as indicated on supplied plans.

5.10 Area 8: Wally's Walk Avenue Planting

Wally's Walk consists of an avenue planting of same species trees. At its full extent, the planting effectively bisects the campus and provides an iconic vista which is synonymous with the university. For the purposes of this report, only Trees 220 to 232, 359 to 370 as well as Tree 860 are being considered as these are within the zone of proposed construction.

Trees 220 to 232 are located on the southern side of Wally's Walk, a major pedestrian thoroughfare. Trees 359 to 370 are located on the northern side of the same pathway. The trees are currently positioned in open garden beds with a ground covering of Persian Ivy (*Hedera cochica*). The canopies of the trees on the southern side of the walkway have been modified to provide approximately 3 metres of clearance from the actual building. This has required both lateral crown reduction and crown raising works.

Tree 860 Callery Pear is an isolated specimen located at end of building W6B between Western Rd and Wally's Walk. It does not appear to be a planting which has been there for very long and is somewhat 'lost' within the landscape.

Construction Impact

The proposed works contain two (2) primary areas of concern for the trees along Wally's Walk. The first issue is the necessity to install scaffolding around the façade of the building to facilitate works on the structure. The second is the proposed opening of the courtyard area to Wally's Walk and the presumed alteration to the soil surface treatment surrounding the trees. In both instances, the primary trees which would be affected by the works are Trees 223 to 232 being those located on the southern side of the walkway and immediately behind W6B.

Installation of scaffolding between the building façade and the subject trees presents issues regarding the potential impacts of the weight of the scaffolding on the soil surrounding the trees, and the bulk and scale of the scaffolding with respect of the trees trunks and branches. As previously discussed, soil compaction has negative impacts on the root plates of trees which manifest as visible decline in the trees themselves. To minimise this compaction, the weight of the scaffolding, which would be quite considerable, should be spread over as wide an area of soil as possible. This would require the use of load bearing plates, or similar, under the feet of the scaffolding. Crane mats or sole boards could be utilised to maximise the load spread.

Fortunately, the subject trees have, over an extended period of time, been pruned away from the side of the building. At present, there exists approximately 3 metres of clearance between the actual building and the tree branches. At ground level, the trees are located approximately 4 metres from the building. These distances should provide ample space in which to install scaffolding which is typically 1200 millimetres in width. Further protection can be afforded the trees by the installation of shade cloth, or other close mesh, down the exterior face of the scaffolding. This would reduce the potential for damage to branches from falling debris and reduce the particulate build up on foliage which can reduce photosynthesis. If installed correctly, the shade cloth could also be used to hold back smaller branches that may encroach into the scaffolding and negate the necessity to have these pruned. This will benefit the trees and be more cost effective for the project.

The supplied plans indicate an intention to open up additional pedestrian access between the courtyard area of W6B and Wally's Walk. This would require the provision and installation of additional paved surfacing over what is currently open soil garden beds. Whilst London Plane trees (*Platanus* x *hybrida*) are generally reasonably tolerant of disturbance, such significant alterations to their existing environment will result in some negative impacts to the trees. To minimise these negative impacts, it is recommended that any proposed pedestrian system within the vicinity of Trees 223 to 232 be designed with both the health of the trees and the

functionality of the area taken into consideration. To achieve the most positive outcome for these iconic trees, it is recommended that both a Landscape Architect/Designer and a Consultant Arborist work on the design for the pedestrian area.

Arboriculturally, reduction of the effective catchment area (open soil) of these trees will have a negative impact on their health and vigour. This impact will manifest visually however, provided the level of alteration is minimised and appropriate support is provided to the trees, they should, in time, adapt to new environmental conditions. To minimise the negative impacts of the environmental changes and maximise the trees adaptability, it is recommended that a maximum area of open soil be retained around the base of each tree. Installation of hard paved surfaces, including permeable paving systems, up to the bases of the trees should be avoided as much as possible. Alternative approaches to design for the space, which permit areas of open soil to be retained whilst permitting pedestrian movement, should be explored and used.

Similarly, any alteration to the existing soil levels within the current garden bed area will have a negative impact on the health, vigour and potentially structure, of these trees. As part of the design for this area, all existing levels should be retained. If level variations are necessitated, the preference for design from an arboricultural perspective would be to have them facilitated by suspended or elevated components over the existing garden bed area. Elements such as raised decking, whether timber or concrete, or suspended slabs could be used to facilitate level retention whilst directing pedestrian traffic through the area.

With regard to Tree 860, from a purely arboricultural perspective, the tree has merit and no issues which would necessarily warrant its removal. From a landscaping and logistical perspective however, its position is somewhat problematic. Whilst it could be retained and protected, the degree of inconvenience and cost associated with doing so, in comparison to its overall retention value, would have to be questioned. This area of garden would be located within a primary area of pedestrian traffic from Wally's Walk into W6B and the courtyard area. As such, it is believed that it would be more prudent to remove this tree and use a portion of the existing garden bed to provide additional trafficable area into the building.

5.11 Preservation of Uncommon Species

During the course of this tree survey, two (2) trees were identified which are considered to be very uncommon and unusual species in the Sydney area. These have been identified as Tree 813 Indian Bean Tree (*Catalpa bignonioides*) and Tree 825 Chinese Parasol Tree (*Firmiana simplex*).

Tree 813, located at the centre of the main entry paths to W6A, is an unusual species native to the southern states of the United States of America. Although a relatively hardy species, its size makes it generally unsuitable for suburban gardens. It does however, make an excellent specimen tree and, being deciduous, provides good amenity when used appropriately. It is in this style that this specimen has been used.

Tree 825 Chinese Parasol Tree (*Firmiana simplex*) is located immediately adjacent to the main pathway entry to W6A and between the two (2) embankment areas. This species is native to the eastern areas of China, Korea, Japan and southeast Asia and is very unusual for Sydney. The

species is related to the cacao family being classified in the Malvaceae family. It is not known to be sold or propagated within Sydney or Australia which would suggest that it has been imported by a staff member or student who has travelled within its native region.

Although both trees have been identified as being very unusual species, it is also appreciated that the location of the trees makes retention and protection of them impossible given the nature and design of the proposed development. For this reason, it is suggested that consideration be given to the collection and propagation of seeds from these two (2) trees so that they may be planted in new locations on the campus. In this way, examples of these unusual species can be retained on site and planting situations, suited to each species, specific characteristics, can be selected to maximise their amenity and horticultural value.

6. RECOMMENDATIONS

As a result of inspection, assessment of the subject trees and the supplied plans, the following recommendations are made;

1. The following trees should be removed;

Area	Tree Identification Numbers
Area 1: W6A North Garden Bed	Trees 771 to 776
Area 2: X5B Garden Grove Planting	None
Area 3: West 3 Car Park Planting	Trees 793 to 807
Area 4: W6A Garden Grove Planting	Trees 808 to 813
Area 5: W6A Embankment Planting	Trees 816 to 849
Area 6: W6A Garden Bed Planting	Trees 814 and 815
Area 7: W6A Courtyard Planting	Trees 850 to 866
Area 8: Wally's Walk Avenue Planting	None

2. The following trees should be retained and protected;

Area	Tree Identification Numbers
Area 1: W6A North Garden Bed	None
Area 2: X5B Garden Grove Planting	Trees 777 to 792
Area 3: West 3 Car Park Planting	None
Area 4: W6A Garden Grove Planting	None
Area 5: W6A Embankment Planting	None
Area 6: W6A Garden Bed Planting	None
Area 7: W6A Courtyard Planting	None
Area 8: Wally's Walk Avenue Planting	Trees 220 to 232 and Trees 359 to 370

3. Seeds should be collected from Tree 813 Indian Bean Tree (*Catalpa bignonioides*) and Tree 825 Chinese Parasol Tree (*Firmiana simplex*). The seeds should be propagated to produce new specimens of these uncommon tree species. The resulting plants should be planted in locations, suitable for each species' specific characteristics and where they are sustainable and viable in the long term.

4. All scaffolding located along the northern façade of W6B should have load bearing plates, or similar, under the base.

5. Scaffolding along the northern façade of W6B should have shade cloth, or other similar close mesh material, installed down the entire northern side of the structure to reduce the fall of debris and particulates.

6. Installation of the scaffolding and erection of the shade cloth covering within the area of Trees 223 to 232 should be supervised by a suitably qualified and experienced Consulting Arborist (minimum qualification of Australian Qualification Framework Level 5). Supervision should aim to;
    a. ensure use, and appropriate placement in relation to trees, of load spreading devices below scaffolding,
    b. provide maximum possible protection to Trees 223 to 232 during scaffolding erection,
    c. ensure installation of shade cloth/mesh covering with minimal damage to trees.

7. The new pedestrian access way between Wally's Walk and W6B Courtyard should be designed so as to minimise the loss of effective catchment area (open soil) to Trees 227 to 232. Use of designated circular garden beds and other design elements which provide pedestrian flow around the trees whilst retaining open soil at their base are recommended.

8. Installation of hard paved surfaces, including permeable paving, up to the bases of Trees 227 to 232 is not recommended.

9. Existing soil levels should be retained within the Tree Protection Zones of Trees 227 to 232.

10. Should soil level variations be necessary within the Tree Protection Zones of Trees 227 to 323, they should be facilitated by structural elements as opposed to either cut or fill.

11. Site Boundary Fencing, which will also act as Tree Protection Fencing in some areas, should be installed in the locations indicated on the Tree Protection Plan (Drawing) provided in Appendix 4 of this report.

Should you require any further information in relation to this report, please contact our office on 1300 737 674.

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CASA RPAS Pilot and Operator

LIMITATION OF LIABILITY

Australian Tree Consultants Pty Ltd (ATC) and their employees are tree specialists who use their qualifications, education, knowledge, training, diagnostic tools and experience to examine trees, recommend measures to enhance the beauty and health of trees, and attempt to reduce the risk of living near trees. Clients may choose to accept or disregard the recommendations of this assessment and report.

ATC and their employees cannot detect every condition that could possibly lead to the structural failure of a tree. Trees are living organisms that fail in ways the arboriculture industry does not fully understand. Conditions are often hidden within trees and below ground. Unless otherwise stated, observations have been visually assessed from ground level. ATC cannot guarantee that a tree will be healthy or safe under all circumstances, or for a specified period of time. Likewise, remedial treatments cannot be guaranteed. The limit of our Professional Indemnity is $10,000.00.

Treatment, pruning and removal of trees may involve considerations beyond the scope of ATC Pty Ltd services, such as property boundaries and ownership, disputes between neighbours, sight lines, landlord-tenant matters, and related incidents. ATC Pty Ltd cannot take such issues into account unless complete and accurate information is given prior or at the time of the site inspection. Likewise ATC Pty Ltd cannot accept responsibility for the authorisation or non-authorisation of any recommended treatment or remedial measures undertaken.

In the event that ATC recommends retesting or inspection of trees at stated intervals or installs any cable/s, bracing systems and support systems ATC must inspect the system installed at intervals not great than 12 months unless other wise specified in written reports. It is the client's responsibility to make arrangements with ATC to conduct the re- inspection.

Trees can be managed, but they cannot be controlled. To live or work near a tree involves a degree of risk. The only way to eliminate all risks associated with a tree is to eliminate the tree.

Trees are living entities. As such, their health may alter, they will grow and their environmental circumstances may change from the time of the site inspection upon which this report is based. For this reason, this report has a maximum validity time of 1 year from the date of being written. Should there be any alteration to the site, the tree or the trees immediate environment from those current at the time of the site inspection, upon which this report is based, the report will become immediately invalid.

All written reports must be read in their entirety, at no time shall part of the written assessment be referred to unless taken in full context of the whole written report. This report remains the intellectual property of Australian Tree Consultants. It has been issued to the identified client for the specified and agreed purpose only. Use of this report for any other purpose or by any other individual or company must have the written consent of Australian Tree Consultants prior to that use. Failure to obtain such consent is deemed a breach of copyright and will result in legal action being undertaken against all parties involved.

If this written report is to be used in a court of law or any legal situation ATC must be advised in writing prior to the written assessment being presented in any form to any other party.

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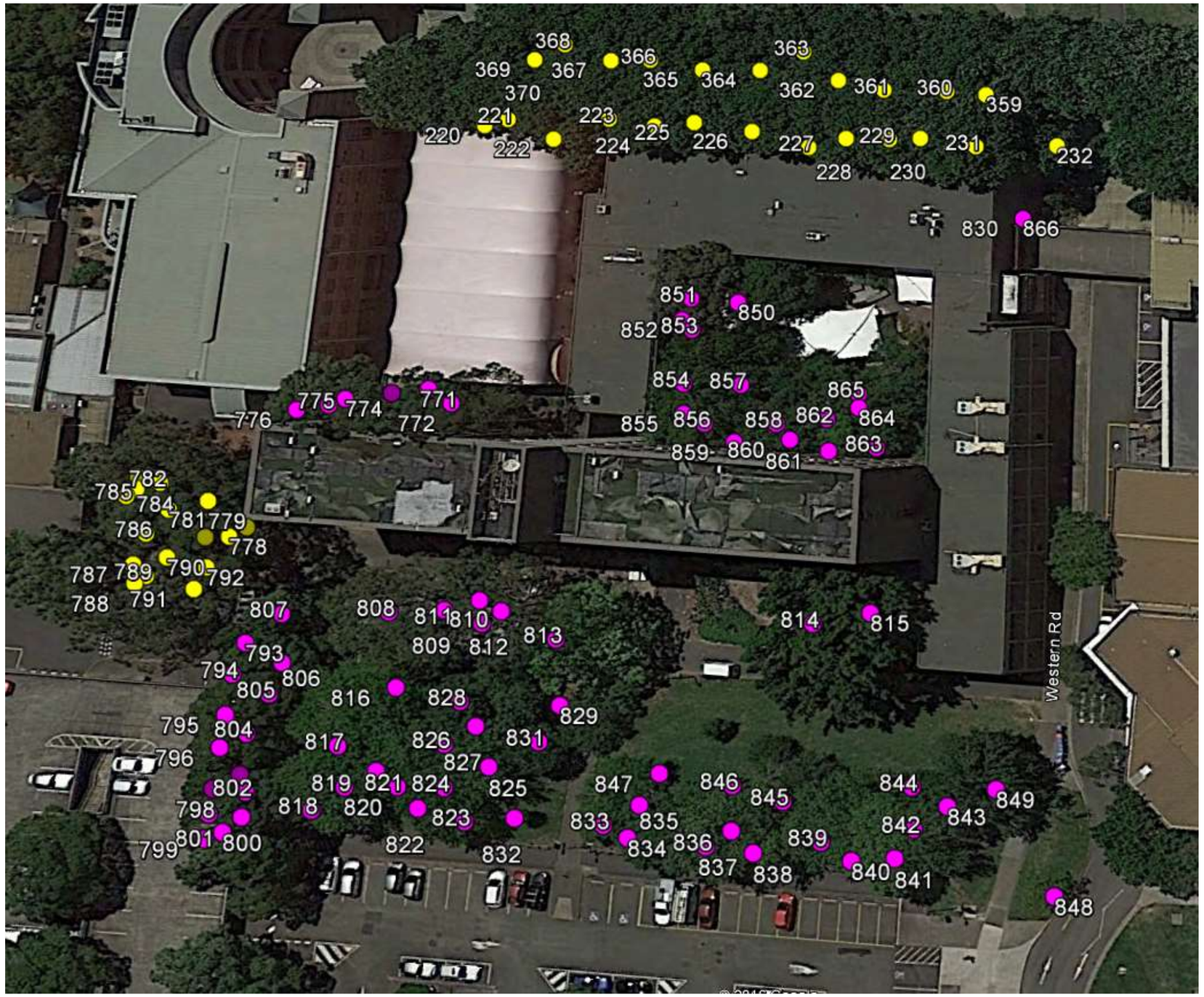
APPENDIX 1: TREE LOCATION PLAN



Map 1. Yellow icon trees retain. Pink icon trees remove.

APPENDIX 2: TREE SCHEDULE

Tree No.	Botanical Name	Common Name	Trees in Group	Height	Canopy Spread	Ø (m)	Ø @ Base (m)	Health	Structure	Age	Tree Defects	Tree Significance	Comments	Tree Protection Zone (TPZ)	Structural Root Zone (SRZ)	Remove/Retain
Area 1: W6A North Garden Bed																
771	*Eucalyptus grandis*	Flooded Gum	1	20-30	10-15	0.56	0.72	Good	Fair	M	Included bark	AV	Heavily crown lifted.	6.72	2.88	Remove
772	*Eucalyptus grandis*	Flooded Gum	1	20-30	10-15	0.45	0.61	Good	Good	SM		AV	Heavily crown lifted.	5.40	2.69	Remove
773	*Eucalyptus grandis*	Flooded Gum	1	15-20	5-10	0.28	0.37	Fair	Good	SM		AV	Heavily crown lifted.	3.36	2.18	Remove
774	*Eucalyptus grandis*	Flooded Gum	1	20-30	10-15	0.42	0.52	Good	Good	SM		AV	Heavily crown lifted.	5.04	2.51	Remove
775	*Eucalyptus grandis*	Flooded Gum	1	20-30	10-15	0.31	0.36	Good	Good	SM		AV	Heavily crown lifted.	3.72	2.15	Remove
776	*Eucalyptus grandis*	Flooded Gum	1	30-50	15-20	0.54	0.74	Good	Poor	M	Bracket fungi	AV	*Phellinus* spp. fruiting body @ 0.4m. Heavily crown lifted.	6.48	2.92	Remove
Area 2: X5B Garden Grove Planting																
777	*Corymbia maculata*	Spotted Gum	1	5-10	<5	0.12	0.185	Fair	Poor	J				2.00	1.63	Retain
778	*Corymbia maculata*	Spotted Gum	1	15-20	5-10	0.49	0.59	Good	Good	M				5.88	2.65	Retain
779	*Corymbia maculata*	Spotted Gum	1	10-15	5-10	0.32	0.4	Good	Good	SM				3.84	2.25	Retain
780	*Corymbia maculata*	Spotted Gum	1	15-20	10-15	0.465	0.56	Good	Good	M			Apical leader lost.	5.58	2.59	Retain
781	*Eucalyptus punctata*	Grey Gum	1	5-10	<5	0.165	0.255	Poor	Fair	SM	Dieback-general			2.00	1.86	Retain
782	*Eucalyptus punctata*	Grey Gum	1	15-20	5-10	0.46	0.6	Fair	Fair	SM	No visual defects sited			5.52	2.67	Retain
783	*Corymbia maculata*	Spotted Gum	1	5-10	<5	0.17	0.225	Good	Good	J	No visual defects sited			2.04	1.77	Retain
784	*Corymbia maculata*	Spotted Gum	1	5-10	<5	0.145	0.21	Good	Good	J	No visual defects sited			2.00	1.72	Retain
785	*Corymbia maculata*	Spotted Gum	1	10-15	5-10	0.53	0.69	Fair	Poor	M	Wound(s) Dieback-general			6.36	2.83	Retain
786	*Corymbia maculata*	Spotted Gum	1	5-10	<5	0.125	0.18	Good	Good	J	No visual defects sited			2.00	1.61	Retain
787	*Eucalyptus punctata*	Grey Gum	1	10-15	5-10	0.445	0.53	Poor	Poor	S	Dieback-general Epicormic growth			5.34	2.53	Retain
788	*Eucalyptus punctata*	Grey Gum	1	20-30	10-15	0.79	0.96	Fair	Good	M	Previous failures Epicormic growth Cross/rubbing branches			9.48	3.25	Retain

Tree No.	Botanical Name	Common Name	Trees in Group	Height	Canopy Spread	Ø (m)	Ø @ Base (m)	Health	Structure	Age	Tree Defects	Tree Significance	Comments	Tree Protection Zone (TPZ)	Structural Root Zone (SRZ)	Remove/Retain
789	*Eucalyptus punctata*	Grey Gum	1	10-15	<5	0.27	0.34	Poor	Fair	SM	Dieback-general Epicormic growth			3.24	2.10	Retain
790	*Eucalyptus punctata*	Grey Gum	1	5-10	5-10	0.205	0.35	Poor	Fair	SM	Dieback-general Epicormic growth Wound(s)			2.46	2.13	Retain
791	*Eucalyptus punctata*	Grey Gum	1	15-20	10-15	0.805	0.95	Fair	Fair	M	No visual defects sited			9.66	3.24	Retain
792	*Corymbia maculata*	Spotted Gum	1	15-20	10-15	0.35	0.45	Fair	Fair	M	No visual defects sited			4.20	2.37	Retain
Area 3: West 3 Car Park Planting																
793	*Lophostemon confertus*	Brush Box	1	5-10	<5	0.23	0.37	Good	Fair	SM	No visual defects sited			2.76	2.18	Remove
794	*Lophostemon confertus*	Brush Box	1	5-10	<5	0.245	0.32	Good	Fair	SM	Wound(s)			2.94	2.05	Remove
795	*Lophostemon confertus*	Brush Box	1	5-10	<5	0.37	0.48	Good	Poor	SM	Included bark			4.44	2.43	Remove
796	*Lophostemon confertus*	Brush Box	1	5-10	<5	0.345	0.455	Good	Fair	SM	No visual defects sited			4.14	2.38	Remove
797	*Lophostemon confertus*	Brush Box	1	10-15	<5	0.37	0.465	Good	Fair	SM	No visual defects sited			4.44	2.40	Remove
798	*Lophostemon confertus*	Brush Box	1	10-15	<5	0.32	0.4	Good	Fair	SM	No visual defects sited			3.84	2.25	Remove
799	*Lophostemon confertus*	Brush Box	1	5-10	<5	0.295	0.365	Fair	Fair	SM	No visual defects sited			3.54	2.17	Remove
800	*Lophostemon confertus*	Brush Box	1	5-10	<5	0.19, 0.135	0.305	Good	Fair	SM	No visual defects sited		Medium branch removed western side @ 0.4m.	2.80	2.01	Remove
801	*Lophostemon confertus*	Brush Box	1	10-15	5-10	0.33	0.44	Good	Good	SM	No visual defects sited		Ring Tail Possum in tree @ time of inspection.	3.96	2.34	Remove
802	*Lophostemon confertus*	Brush Box	1	10-15	5-10	0.42	0.51	Good	Good	SM	No visual defects sited		On corner of embankment.	5.04	2.49	Remove
803	*Lophostemon confertus*	Brush Box	1	<5	<5			Poor	Poor	J	Poor tree form		Not tagged due to size. Very small, stunted tree. Possible replacement planting.			Remove
804	*Lophostemon confertus*	Brush Box	1	5-10	<5	0.2	0.25	Poor	Fair	SM	Wound(s) Dieback-general Epicormic growth			2.40	1.85	Remove
805	*Lophostemon confertus*	Brush Box	1	10-15	5-10	0.37	0.43	Good	Fair	SM	No visual defects sited			4.44	2.32	Remove
806	*Lophostemon confertus*	Brush Box	1	10-15	5-10	0.375	0.48	Good	Fair	SM	No visual defects sited			4.50	2.43	Remove

Tree No.	Botanical Name	Common Name	Trees in Group	Height	Canopy Spread	Ø (m)	Ø @ Base (m)	Health	Structure	Age	Tree Defects	Tree Significance	Comments	Tree Protection Zone (TPZ)	Structural Root Zone (SRZ)	Remove/Retain
807	*Lophostemon confertus*	Brush Box	1	10-15	5-10	0.28	0.4	Good	Fair	SM	No visual defects sited		Retaining wall <0.2m to north. Encroaches on SRZ.	3.36	2.25	Remove
Area 4: W6A Garden Grove Planting																
808	*Corymbia citriodora*	Lemon-scented Gum	1	15-20	10-15	0.44	0.545	Good	Good	M	No visual defects sited			5.28	2.56	Remove
809	*Corymbia citriodora*	Lemon-scented Gum	1	15-20	10-15	0.355	0.46	Good	Good	M	No visual defects sited			4.26	2.39	Remove
810	*Corymbia citriodora*	Lemon-scented Gum	1	15-20	10-15	0.32	0.43	Good	Good	M	No visual defects sited			3.84	2.32	Remove
811	*Corymbia citriodora*	Lemon-scented Gum	1	10-15	10-15	0.295	0.36	Good	Good	M	No visual defects sited			3.54	2.15	Remove
812	*Corymbia citriodora*	Lemon-scented Gum	1	20-30	10-15	0.425	0.5	Good	Good	M	No visual defects sited			5.10	2.47	Remove
813	*Catalpa bignonioides*	Indian Bean Tree	1	10-15	10-15	0.645	0.72	Poor	Fair	M	Wound(s) Poor pruning		Native bee hive in trunk. Entry near tag and in wound face.	7.74	2.88	Remove
Area 6: W6A Garden Bed Planting																
814	*Ficus microcarpa* var. *hillii*	Hills Weeping Fig	1	15-20	15-20	0.34, 0.315, 0.36, 0.37	0.69	Good	Fair	M	Included bark	HBE	Multiple leaders @ 0.7m. Brush Turkey nest in close proximity, does not appear to be currently active.	8.33	2.83	Remove
815	*Ficus microcarpa* var. *hillii*	Hills Weeping Fig	1	15-20	15-20	0.88	0.88	Good	Fair	M	Included bark	HBE	Branches @ 0.8m. Branch tear out @ centre. Wound face appears stable. Brush Turkey nest in close proximity, does not appear to be currently active.	10.56	3.14	Remove
Area 5: W6A Embankment Planting																
816	*Prunus blireana*	Flowering Cherry Plum	1	<5	<5	-	-	Fair	Poor	M	Poor tree form					Remove
817	*Acer negundo*	Box Elder	1	5-10	10-15	-	-	Fair	Poor	S	Previous failures Epicormic growth					Remove
818	*Acer negundo*	Box Elder	1	5-10	10-15	-	-	Fair	Poor	S	Previous failures Epicormic growth					Remove
819	*Acer negundo*	Box Elder	1	5-10	<5	-	-	Poor	Poor	S	Previous failures Epicormic growth Deadwood 5 - 10cm diam.					Remove

Tree No.	Botanical Name	Common Name	Trees in Group	Height	Canopy Spread	Ø (m)	Ø @ Base (m)	Health	Structure	Age	Tree Defects	Tree Significance	Comments	Tree Protection Zone (TPZ)	Structural Root Zone (SRZ)	Remove/Retain
820	*Acer negundo*	Box Elder	1	5-10	<5	-	-	Poor	Poor	S	Previous failures Epicormic growth Deadwood 5 - 10cm diam.					Remove
821	*Acer negundo*	Box Elder	1	5-10	5-10	-	-	Poor	Fair	M	Previous failures Epicormic growth Deadwood 5 - 10cm diam.					Remove
822	*Acer negundo*	Box Elder	1	5-10	5-10	-	-	Poor	Fair	M	Previous failures Epicormic growth Deadwood 5 - 10cm diam.					Remove
823	*Prunus blireana*	Flowering Cherry Plum	1	<5	<5	-	-	Fair	Fair	M	No visual defects sited					Remove
824	*Prunus blireana*	Flowering Cherry Plum	1	5-10	<5	-	-	Fair	Fair	M	Deadwood 5 - 10cm diam.					Remove
825	*Firmiana simplex*	Chinese Parasoletree	1	5-10	5-10	-	-	Good	Good	M	No visual defects sited					Remove
826	*Prunus blireana*	Flowering Cherry Plum	1	5-10	5-10	-	-	Fair	Poor	M	Epicormic growth Included bark					Remove
827	*Prunus blireana*	Flowering Cherry Plum	1	<5	<5	-	-	Fair	Poor	SM	Epicormic growth Included bark					Remove
828	*Robinia pseudoacacia* 'Frisia'	Golden Robinia	1	5-10	5-10	-	-	Fair	Fair	M	Dieback-general					Remove
829	*Acer negundo*	Box Elder	1	5-10	<5	-	-	Poor	Fair	M	Dieback-general					Remove
830	*Acer negundo*	Box Elder	1	5-10	<5	-	-	Poor	Fair	M	Dieback-general					Remove
831	*Prunus cerasifera*	Cherry Plum	1	5-10	5-10	-	-	Fair	Fair	M	No visual defects sited					Remove
832	*Hibiscus* sp.	Hibiscus	1	<5	<5	-	-	Good	Fair	M	No visual defects sited					Remove
833	*Acer negundo*	Box Elder	1	5-10	5-10	-	-	Fair	Poor	M	Cavity(s)	HBE				Remove
834	*Robinia pseudoacacia 'Frisia'*	Golden Robinia	1	5-10	5-10	-	-	Poor	Fair	M	Epicormic growth					Remove
835	*Acer negundo*	Box Elder	1	5-10	5-10	-	-	Fair	Poor	M	Cavity(s)					Remove
836	*Acer negundo*	Box Elder	1	10-15	10-15	-	-	Poor	Poor	M	Cavity(s) Deadwood 10cm plus diam.					Remove

Tree No.	Botanical Name	Common Name	Trees in Group	Height	Canopy Spread	Ø (m)	Ø @ Base (m)	Health	Structure	Age	Tree Defects	Tree Significance	Comments	Tree Protection Zone (TPZ)	Structural Root Zone (SRZ)	Remove/Retain
837	*Acer negundo*	Box Elder	1	5-10	5-10	-	-	Poor	Poor	M	Cavity(s) Deadwood 10cm plus diam.					Remove
838	*Acer negundo*	Box Elder	1	5-10	5-10	-	-	Poor	Poor	S	Cavity(s) Deadwood 5 - 10cm diam. Epicormic growth					Remove
839	*Acer negundo*	Box Elder	1	10-15	10-15	-	-	Poor	Poor	S	Cavity(s) Deadwood 5 - 10cm diam. Epicormic growth					Remove
840	*Acer negundo*	Box Elder	1	10-15	10-15	-	-	Poor	Poor	S	Cavity(s) Deadwood 5 - 10cm diam. Epicormic growth					Remove
841	*Acer negundo*	Box Elder	1	5-10	5-10	-	-	Poor	Poor	S	Cavity(s) Deadwood 5 - 10cm diam. Epicormic growth					Remove
842	*Acer negundo*	Box Elder	1	10-15	10-15	-	-	Poor	Poor	S	Cavity(s) Deadwood 5 - 10cm diam. Epicormic growth					Remove
843	*Populus deltoides*	Cottonwood	1	10-15	10-15	-	-	Poor	Hazard	S	Cavity(s) Deadwood 5 - 10cm diam. Epicormic growth		Recommended immediate removal.			Remove
844	*Prunus blireana*	Flowering Cherry Plum	1	<5	<5	-	-	Fair	Poor	M	Poor pruning					Remove
845	*Spiraea cantoniensis*	Queen of the Meadow	1	5-10	5-10	-	-	Fair	Poor	M	Previous failures					Remove
846	*Prunus blireana*	Flowering Cherry Plum	1	<5	<5	-	-	Poor	Poor	M	Previous failures Epicormic growth Poor pruning					Remove
847	*Magnolia champaca*	Champac	1	<5	<5	-	-	Fair	Fair	M	No visual defects sited					Remove
848	*Melia azedarach*	White Cedar	1	<5	<5	-	-	Fair	Fair	SM	No visual defects sited					Remove
849	*Acer negundo*	Box Elder	1	<5	<5	-	-	Poor	Poor	SM	Deadwood <-5cm diam. Cavity(s) Decay Poor tree form					Remove

Tree No.	Botanical Name	Common Name	Trees in Group	Height	Canopy Spread	Ø (m)	Ø @ Base (m)	Health	Structure	Age	Tree Defects	Tree Significance	Comments	Tree Protection Zone (TPZ)	Structural Root Zone (SRZ)	Remove/Retain
Area 7: W6B Courtyard Planting-																
850	*Acer buergerianum*	Trident Maple	1	15-20	10-15	0.32	0.39	Good	Good	M	No visual defects sited			3.84	2.23	Remove
851	*Melaleuca quinquenervia*	Broad-leaved Paperbark	1	15-20	5-10	0.635	0.67	Good	Good	M	No visual defects sited			7.62	2.80	Remove
852	*Melaleuca quinquenervia*	Broad-leaved Paperbark	1	15-20	<5	0.35	0.43	Fair	Fair	M	No visual defects sited			4.20	2.32	Remove
853	*Melaleuca quinquenervia*	Broad-leaved Paperbark	1	15-20	5-10	0.38, 0.42	0.615	Fair	Fair	M	Deadwood 5 - 10cm diam.		Dual leaders @ 1.4m. Main junction included.	6.80	2.70	Remove
854	*Liquidamber styraciflua*	Liquidambar	1	20-30	10-15	0.54	0.6	Fair	Poor	M	Included bark Epicormic growth Previous failures		Included junctions throughout canopy.	6.48	2.67	Remove
855	*Sapium sebiferum*	Chinese Tallow Tree	1	15-20	5-10	N/A	N/A	Fair	Poor	M	Poor pruning Deadwood <-5cm diam.			N/A	N/A	Remove
856	*Sapium sebiferum*	Chinese Tallow Tree	1	15-20	5-10	N/A	N/A	Fair	Poor	M	Poor pruning Deadwood <-5cm diam.			N/A	N/A	Remove
857	*Ulmus parvifolia*	Chinese Weeping Elm	1	5-10	10-15	0.32, 0.35	0.43	Poor	Fair	M	Epicormic growth Dieback-general Epicormic growth	HBE	Dual leaders @ 1.3m. Main stem junction occluded.	5.69	2.32	Remove
858	*Ulmus parvifolia*	Chinese Weeping Elm	1	5-10	5-10	0.21, 0.15	0.3	Poor	Fair	M	Epicormic growth Dieback-general		Dual leaders @ 1.4m. Main stem junction occluded.	3.10	2.00	Remove
859	*Ulmus parvifolia*	Chinese Weeping Elm	1	5-10	5-10	-	-	Poor	Fair	M	Epicormic growth Dieback-general					Remove
860	*Sapium sebiferum*	Chinese Tallow Tree	1	5-10	5-10	0.23	0.26	Poor	Poor	M	Wound(s) Dieback-general		Through landing tiles. Tiles cutting into the trunk. Not sustainable.	2.76	1.88	Remove
861	*Ulmus parvifolia*	Chinese Weeping Elm	1	5-10	5-10	0.15	N/A	Poor	Poor	M	Wound(s) Dieback-general			2.00		Remove
862	*Ulmus parvifolia*	Chinese Weeping Elm	1	5-10	5-10	0.21, 0.21	0.325	Poor	Fair	M	Deadwood <-5cm diam. Dieback-general Epicormic growth Poor pruning		Multiple leaders @ 1.4m. Main stem junction occluded. 3rd leader dead.	3.56	2.06	Remove

Tree No.	Botanical Name	Common Name	Trees in Group	Height	Canopy Spread	Ø (m)	Ø @ Base (m)	Health	Structure	Age	Tree Defects	Tree Significance	Comments	Tree Protection Zone (TPZ)	Structural Root Zone (SRZ)	Remove/Retain
863	*Acer palmatum*	Japanese Maple	1	<5	5-10	N/A	N/A	Fair	Poor	M	Deadwood <-5cm diam. Dieback-general Epicormic growth Poor pruning Wound(s)			N/A	N/A	Remove
864	*Ulmus parvifolia*	Chinese Elm	1	5-10	5-10	0.165, 0.17, 0.11	0.275	Poor	Fair	M	Deadwood <-5cm diam. Dieback-general Epicormic growth Poor pruning Wound(s)			3.13	1.92	Remove
865	*Ulmus parvifolia*	Chinese Elm	1	5-10	5-10	0.3	0.32	Poor	Fair	M	Deadwood <-5cm diam. Dieback-general Epicormic growth Poor pruning Wound(s)			3.60	2.05	Remove
866	*Pyrus calleryana*	Callery Pear	1	5-10	<5	0.15	0.165	Good	Poor	SM	Included bark			2.00	1.55	Remove
Area 8: Wally's Walk Avenue Planting (South Side)																
220	*Platanus x hybrida*	London Plane	1	15-20	15-20	0.8	0.88	Good	Fair	M	No visual defects sited	ST & AV	Epicormic shoots from base.	9.60	3.14	Retain
221	*Platanus x hybrida*	London Plane	1	15-20	10-15	0.565	0.64	Good	Fair	M	No visual defects sited	ST & AV		6.78	2.74	Retain
222	*Platanus x hybrida*	London Plane	1	15-20	10-15	0.66	0.71	Good	Fair	M	No visual defects sited	ST & AV	Approx. 2m from concrete path.	7.92	2.87	Retain
223	*Platanus x hybrida*	London Plane	1	15-20	10-15	0.69	0.83	Good	Fair	M	No visual defects sited	ST & AV	Approx. 1m from concrete path.	8.28	3.06	Retain
224	*Platanus x hybrida*	London Plane	1	15-20	10-15	0.71	0.79	Good	Good	M	No visual defects sited	ST & AV		8.52	3.00	Retain
225	*Platanus x hybrida*	London Plane	1	15-20	10-15	0.51	0.59	Good	Good	M	No visual defects sited	ST & AV		6.12	2.65	Retain
226	*Platanus x hybrida*	London Plane	1	15-20	10-15	0.58	0.59	Good	Good	M	No visual defects sited	ST & AV		6.96	2.65	Retain
227	*Platanus x hybrida*	London Plane	1	15-20	10-15	0.46	0.53	Good	Fair	M	No visual defects sited	ST & AV		5.52	2.53	Retain
228	*Platanus x hybrida*	London Plane	1	15-20	10-15	0.575	0.59	Good	Fair	M	No visual defects sited	ST & AV		6.90	2.65	Retain
229	*Platanus x hybrida*	London Plane	1	15-20	10-15	0.63	0.69	Good	Fair	M	No visual defects sited	ST & AV		7.56	2.83	Retain
230	*Platanus x hybrida*	London Plane	1	15-20	10-15	0.55	0.63	Good	Good	M	No visual defects sited	ST & AV		6.60	2.73	Retain

Tree No.	Botanical Name	Common Name	Trees in Group	Height	Canopy Spread	Ø (m)	Ø @ Base (m)	Health	Structure	Age	Tree Defects	Tree Significance	Comments	Tree Protection Zone (TPZ)	Structural Root Zone (SRZ)	Remove/Retain
231	*Platanus* x *hybrida*	London Plane	1	15-20	10-15	0.59	0.69	Fair	Good	M	No visual defects sited	ST & AV		7.08	2.83	Retain
232	*Platanus* x *hybrida*	London Plane	1	15-20	10-15	0.78	0.88	Good	Good	M	No visual defects sited	ST & AV	Ivy removed from base. Soil disturbed, possible root damage.	9.36	3.14	Retain
Area 8: Wally's Walk Avenue Planting (North Side)																
359	*Platanus* x *hybrida*	London Plane	1	15-20	5-10			Good	Good	M	No visual defects sited	ST & AV				Retain
360	*Platanus* x *hybrida*	London Plane	1	15-20	5-10			Good	Good	M	No visual defects sited	ST & AV				Retain
361	*Platanus* x *hybrida*	London Plane	1	15-20	5-10			Good	Good	M	No visual defects sited	ST & AV				Retain
362	*Platanus* x *hybrida*	London Plane	1	15-20	5-10			Fair	Good	M	No visual defects sited	ST & AV				Retain
363	*Platanus* x *hybrida*	London Plane	1	15-20	5-10			Fair	Good	M	No visual defects sited	ST & AV				Retain
364	*Platanus* x *hybrida*	London Plane	1	15-20	5-10			Good	Good	M	No visual defects sited	ST & AV				Retain
365	*Platanus* x *hybrida*	London Plane	1	15-20	5-10			Good	Good	M	No visual defects sited	ST & AV				Retain
366	*Platanus* x *hybrida*	London Plane	1	15-20	5-10			Good	Good	M	No visual defects sited	ST & AV				Retain
367	*Platanus* x *hybrida*	London Plane	1	15-20	5-10			Good	Good	M	No visual defects sited	ST & AV				Retain
368	*Platanus* x *hybrida*	London Plane	1	15-20	5-10			Good	Good	M	No visual defects sited	ST & AV				Retain
369	*Platanus* x *hybrida*	London Plane	1	15-20	5-10			Good	Good	M	No visual defects sited	ST & AV				Retain
370	*Platanus* x *hybrida*	London Plane	1	15-20	10-15			Good	Good	M	No visual defects sited	ST & AV				Retain

APPENDIX 3: ARBORICULTURAL TERMINOLOGY AND SYMBOLOGY

Tree ID No — A unique identification number assigned to a particular tree and used to identify it throughout the report.

Common Name — The name in common use and accepted by most persons for that particular species.

Botanical Name — The taxonomic name, expressed in binomial nomenclature, derived from visual identification features and visible from ground level or specimen collection.

Height (m) — The visually estimated height of the tree in metres.

Width — The visually estimated maximum average width of the canopy measured in metres.

Ø (m) — Diameter at Breast Height (DBH) measured at 1.4m above ground, unless otherwise noted, as outlined in AS 4970 – 2009.

Ø @ Base (m) — Diameter at Base measured above the root flares and below the DBH as outlined in AS4970-2009.

Health

Good In good, health with no significant health issues visible.
Fair Some health issues which could be addressed by intervention.
Poor Significant health issues that could be addressed by intervention.
Very Poor Significant health issues which are unlikely to be addressed by intervention.
Senescent Tree has entered a cycle of decline from where it is unlikely to recover regardless of intervention.

Structure

Good No visible defects within the structure of the tree.
Fair Minor visible defects within the structure of the tree relative to the species.
Poor Major visible defects within the structure of the tree relative to the species.
Very Poor Significant visible defects within the structure of the tree relative to the species.

Age

J Juvenile – young tree that is yet to establish.
SM Semi-mature – an established tree but one that has not attained its full genetic potential for size and/or form.
M Mature – a tree that has attained its full genetic potential in size and/or form.
OM Over Mature – a tree that is no longer capable of further growth and/or has entered a cycle of decline.

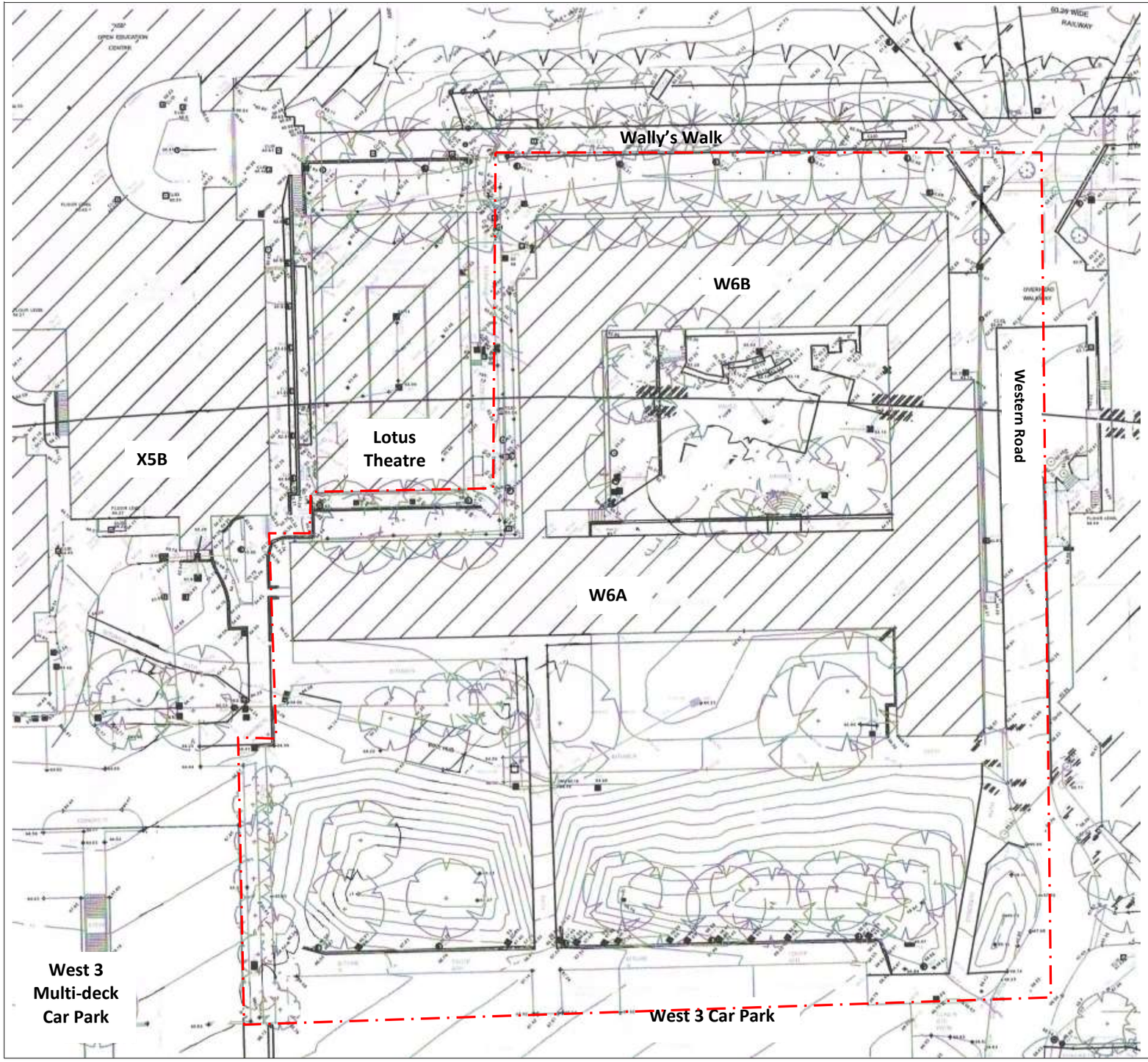
Significance

HBE *Habitat Tree* – a tree which is currently being used by an identified animal or bird species.
LIS *Locally Indigenous Species* – a species of tree which is recognised as being indigenous to the local area.
EEC *Endangered Ecological Community* – a species of tree that is recognised as being indicative of and in a situation which could be an identified Endangered Ecological Community under Federal/State law.
AV *Amenity Value* – a tree which has an identifiable amenity value to the site or its immediate neighbours.
HS *Historic Significance* – a tree which has recognised or potential historical value to the site or community.
ST *Significant Tree* – a tree which is by virtue of size, age, form or other identifiable feature or attribute is considered significant.

Tree Protection Zone — A defined, radial area within which certain activities are prohibited or restricted to prevent or minimise potential injury to designated trees. Calculated using the formula outlined in AS4970-2009.

Structural Root Zone — A radial area of soil around a tree where the majority of the structural roots are located and in which encroachment or activity is prohibited to prevent or minimise the potential for destabilisation of designated trees. Calculated using the formula outlined in AS4970-2009.

APPENDIX 4: TREE PROTECTION PLAN (DRAWING)



KEY

Indicative location of Construction Site Boundary/Tree Protection Fencing.

Notes

1. Scaffolding installed along the northern façade of W6B must;

   a. be installed using load spreading plates or sole boards below all feet of the scaffolding,

   b. have shade cloth or similar close mesh covering installed across the full extent of the northern face of the scaffolding structure,

   c. be installed under the supervision and with the guidance of a Consultant Arborist (minimum qualification AQF Level 5).

2. Existing soil levels must be retained within the garden bed along the northern façade of W6B.