Arboricultural Impact Assessment

Site Address: Westfield Penrith
Prepared for: Scentre Group
Prepared by: George Palmer
Dated: September, 2019

Contents

1.0 INTRODUCTION

1.1 Background

1.1.1 This Construction Impact Assessment and Management Plan has been prepared for, and in consultation with Scentre Group on behalf of the property owner. This has been done to detail the arboricultural impacts associated with the alterations and additions to the Westfield Shopping Centre in Penrith.

1.1.2 It has been reported that the Shopping Centre was constructed in 1971. Although the site has been partially remodelled throughout the period, the space no longer appropriately facilitates the changing demographic and social requirements of the surrounding environment. The proposed alterations will re address the arboricultural context of the existing trees and make proposals for the reintroduction of locally native species for a number of environmental and social reasons.

1.1.3 The purpose of this report is to identify all existing trees, assess both health and condition, determine landscape significance and life expectancy. A determination for preservation, removal or transplantation will be made based on sustainability and suitability within the setting. For the purpose of this report *Botanics* has assessed the likely impact that the proposed development will have on the subject trees. This report will then provide recommendations in relation to the management of these in accordance with Australian Standard (AS) *4970 for the Protection of Trees on Development Sites.* Pruning and removal works will be based on *AS4373 for the Pruning of Amenity trees* where applicable.

1.2 The Proposal

1.2.1 The proposed works will reconfigure and modernise the documented outdoor space.

1.2.2 The landscape and construction detail have been documented within the Westfield Penrith Alterations and Additions plans dated 17.09.19. These include;

- Westfield Penrith Alterations and Additions Site Analysis Plan 0.02.
- Westfield Penrith Alterations and Additions Concept Diagrams 0.03-0.14.
- Westfield Penrith Alterations and Additions Floor Plans 1.01-1.08.
- Westfield Penrith Alterations and Additions elevations Sections and Material Finishes 2.01 - 2.03
- Westfield Penrith Alterations and Additions Shadow Diagrams 3.01 and 3.02.

1.3 The supplied plans show that the works will require;

- The reconfiguration of the entry atrium.
- The construction of an semi covered Arbour and Awning.

- The partial extension of the southern and western building footprints adjacent to the Joan Sutherland Centre.

2.0 RESULTS

2.1 The Site

2.1.1 The site comprises both public and private open space providing pedestrian access to the Westfield complex, the Joan Sutherland Performing Arts Centre, as well as the Penrith City Library and Penrith Council. The site also provides vehicular access to the car parking facility with access from High Street as detailed.

2.2 The Trees

2.2.1 A total of twenty seven (27) trees have been assessed using Visual Tree Assessment (VTA) criteria and notes. As required under Clause 2.3.2 of the Australian Standard 4970 (2009) for the Protection of Trees on Development Sites, each tree has been allocated a Retention Value based on the tree's Useful Life Expectancy and Landscape Significance with consideration to its health, structure, condition and site suitability. The Retention Value does not take into account any proposed development. All trees have been allocated 1 of 4 Retention Values;

- High Value - Priority for Retention.
- Moderate Value - Consider for Retention.
- Low Value - Consider for Removal.
- Remove - Recommended for Removal Irrespective of works.

Refer to Tree Table and Tree Assessment Schedule.

2.2.2 The site's most significant arboricultural amenity contribution comes from a number of semi mature Jacarandas. These have been planted without real consideration as to their biological potential, with several trees located within 2m on each other and close to building footprints. This will affect their growth and limits their Value to Moderate or Low.

2.2.3 Trees 1, 2 and 3 are all *Robinia pseudoacacia,* or False Robinia trees located on the eastern edge of the adjacent Council reserve. These are all semi mature examples of their species that have failed to fully develop in this location and have been rated as Low Value.

2.2.4 Trees 4, 5, 6 and 7 are all *Jacaranda mimosifolia,* or Jacaranda trees. These have all been planted adjacent to the building's south western corner and have developed with compromised canopies due to their phototropic response to the shadowing of the adjacent building and their neighbours. The trees will also have limited access to soil moisture and nutrients with the building footprint affecting the abiotic development of feeder and structural roots. https://en.wikipedia.org/wiki/Abiotic_component.

2.2.5 Trees 8 and 9 are both well established, yet semi mature *Ficus benjamina,* or Benjamina Figs. These have been a popular indoor ornamental plant that may have been planted here as part of some more recent landscape works. These are both supported on trunks that are included and will not have been purchased, or planted following NATSPEC Guidelines for the nursery tree plantings. While both remain in good health, they are structurally compromised and remain a small fraction of their full biological potential and have been given a Removal recommendations, irrespective of the proposed development.

2.2.6 Tree 10 and 11 are both *Jacaranda mimosifolia's* that have developed with three (3) leaders that fork from ground level and are partially included. These are structural faults that will undermine their arboricultural significance, although their locations and the nature of these inclusions limit the hazard associated with them here.

2.2.7 Trees 12 - 19 comprise a stand of semi mature *Gleditsia tricanthos,* or Honey Locust. These will all have been planted within the past twenty (20) years and have been planted too close to each other to allow for the development of full and independent canopies. Several have become suppressed by dominant neighbouring trees and all have developed a network of surface roots. As such, all have been considered as Low Value due to their exotic provenance, poor form and associated species characteristics.

2.2.8 Tree 20 is a semi mature *Annona montana* or Mountain Soursop. This tree will have been planted here as part of more recent planting works and has developed relatively well. The tree has grown to a height of approximately 12m and holds a full canopy. The tree has been given a Moderate Value and should be considered for retention.

2.2.9 Trees 21, 22, 23, 24 and 25 are all Gleditsia's that have been planted within relatively small planters between the building's southern footprint and the northern edge of the neighbouring carpark. All have developed with relatively thin and lightly foliated canopies due to both the limited availability of soil moisture and nutrients and limited access to sun light. All have been given a Low Value for these and the exotic nature and species characteristics.

2.2.10 The final trees assessed are the two (2) *Gleditsia* on the eastern side of the pedestrian access way adjacent to the southern edge of the building footprint. These have developed better due to improved solar access, as well as reduced competition.

3.0 ARBORICULTURAL IMPACT ASSESSMENT

3.1 Trees 1, 2 and 3 have all failed to develop to their potential due to a range of reasons. Trees 1 and 2 both show die back with dead wood throughout their upper canopies. Tree 3 has a large section of visible decay from ground level. All are however located outside the construction impact zone of the proposed works and have been documented for retention despite their Low Value.

3.2 Trees 4, 5, 6 and 7 are all *Jacaranda mimosifolia's* located on the southern edge of the existing building footprint. Trees 5 and 6 are both suppressed by their neighbours trees (T4 and T7), as well as the phototropic

effect of the building footprint. This has resulted in the development of canopies that protrude further south, as well as promoting the growth of surface roots. https://en.wikipedia.org/wiki/Phototropism.

3.3 Trees 8 and 9 are both *Ficus benjamina,* or Benjamina Figs. As noted, these were a popular indoor ornamental tree that appear to have been planted following a period of its juvenile life spent as an indoor tree. These trees may have started as multiple tube stock and allowed to develop as a single specimen. This does not comply with NATSPEC standards for the nursery plant stock and should not have been planted here. Both trees have been recommended for removal irrespective of the proposed development for these reasons.

3.4 Trees 10 and 11 are both well established Jacaranda's located centrally within the courtyard. These trees have both developed on three (3) leaders, all of which seperate at ground level and appear to be partially included. This is a structural fault that can lead to the failure of the subdominant leader, although the relatively protected nature of this location and the tree's current good health will limit the practical hazard associated with this.

3.5 Trees 12 - 19 comprise a stand of juvenile to semi mature *Gleditsia tricanthos* that have been planted in a formal grid formation within an external courtyard. These have all been planted within 3m of each other and have partially suppressed their neighbours. This, and the phototropic nature of the species has resulted in the formation of canopies that have developed on leans, predominantly to the north and west to gain solar access. All have developed with a network of exposed surface roots that is a common issue with the species.

3.6 Tree 20 is a well established example of the *Annona montana* species that is likely to have been transplanted here as a semi mature tree. This tree has established well in this location although it is unlikely to flourish.

3.7 Trees 21, 22, 23, 24 and 25 comprise another small stand of Gleditsia that have been planted within smaller planters between the buildings southern boundary and the carparks north western corner. Again, these have been affected by both the shadowing that comes from the surrounding buildings and the limited volumes of soil available in the planters. This has resulted in the development of less full canopies that would otherwise be expected and trees that have developed on varying leans to better gain solar access.

3.8 Tree 26 and 27 are the remaining Gleditsia's documented. These are both located further to the east of the previously detailed Gleditsia's and are in better condition due to reduced competition for soil moisture and nutrients.

4.0 DISCUSSION

4.1 The proposed works will involve the extension of the construction footprint south as detailed. This will require the removal of Trees 8, 9, 21, 22, 23, 24, 25, 26 and 27. As noted, the Ficus trees documented as Trees 8 and 9 are poorly structured indoor ornamentals that should be removed irrespective of the proposed development. The remaining Gleditsia's documented as Trees 21,22,23,24,25,26 and 27 are Low Value Environmental Weed species.

4.2 Both of the Jacaranda's documented (Trees 10 and 11) have developed on three (3) multiple trunks that fork from ground level. This is both a coincidence and structural fault that has undermined the arboricultural significance of each of these trees. Although well established, both have been considered as Low Value for these reasons. Tree 10 is located centrally within the courtyard, while Tree 11 is located adjacent to its western boundary. The proposed construction has however been set back to allow for its retention.

4.3 The *Gleditsia tricanthos* (Trees 12-19 and 21-27) are a well recognised Class 3 Environmental Weed Species http://www.environment.gov.au/cgi-bin/biodiversity/invasive/weeds/weeddetails.pl?taxon_id=21077. and should not have been planted here for a broad range of reasons. They do however provide a degree of positive amenity and have been documented for preservation.

4.4 Tree 20 is a well established *Annona,* or Soursop tree https://en.wikipedia.org/wiki/Annona. As noted, this will likely have been transplanted here as part of some more recent planting works. This tree will be preserved through the construction process.

5.0 CONCLUSIONS

5.1 The proposed works improve both pedestrian and vehicular access to the site, as well as view lines and visual amenity throughout the site.

5.2 The proposed plantings will improve long term horticultural and arboricultural amenity, as well as creating a sense of place within the context of the surrounding landscape.

5.3 Those trees required for removal are all Low Value and should not be considered as a material constraint to the development process.

6.0 RECOMMENDATIONS

6.1 This report will recommend the removal of Trees 8, 9, 21, 22, 23, 24, 25, 26 and 27. All are Low Value and should be removed irrespective of the proposed development.

6.2 The remaining trees documented here will be preserved. This will be done via the implementation of the following list of recommendations where applicable. These have been based on our national standard for the *Protection of Trees on Development Sites AS4970* and the authors experience.

6.3 All construction works should be done from within the construction impact zone to limit the indirect impacts of the development process. No works are to be undertaken outside those detailed here. All Tree Protection Zones will be fenced off, marked as a Tree Protection Zone (TPZ) and mulched in accordance with the following conditions.

6.4 All trees documented for preservation will be preserved with the implementation of the following list of *Tree Preservation Recommendations.* These have been based on our *National Standard for the Protection of Trees on Development Sites AS4970* and should be implemented during the construction process, where applicable.

6.5 The remainder of the indirect construction impacts should be mitigated with the implementation of the following.

6.6 Appointment of Site Arborist

A site arborist shall be appointed prior to the commencement of work on site. The Site Arborist shall clearly mark out all trees to be removed and ensure that all trees documented for retention are preserved with the implementation of the following tree protection measures. The Site Arborist shall have a minimum qualification equivalent to a NSW TAFE Certificate Level 5 or above in Arboriculture.

6.7 Inspection Points

Give 5 working days notice to allow inspections to be undertaken at the following stages;

Inspection Point	Inspection Personnel
Installation of Tree Protection Zones including Tree Protection Fencing, Silt Fencing and Signage	Site Arborist
Modification of the Tree Protection Zone	Site Arborist
Works within the Tree Protection Zone	Site Arborist
Completion of Construction Works	Site Arborist Site Supervisor.

6.8 Education

Contractors and site workers shall receive a copy of these specifications prior to the commencement of work. Contractors and site workers undertaking any works within a TPZ shall sign the site log to confirm that they have read and understand these specifications prior to their undertaking.

6.9 Tree Protection Zones

Where applicable, all trees to be retained through the construction process shall be protected from mechanical damage and the indirect impacts of the construction process with the installation of Tree Protection Zones. Unless otherwise stated, the following activities must not be carried out within a TPZ;

- modification of existing soil levels
- excavation or trenching
- cultivation of soil
- mechanical removal of vegetation
- movement of natural rock
- storage of materials, plant or equipment
- erection of site sheds
- affixing signage or hoarding to trees
- disposal of chemical waste or construction material
- any activity that may directly or indirectly affect the health of these or surrounding trees.

Note: If access to a TPZ is required as part of the approved development, prior authorisation is required by the Site Arborist.

6.10 Tree Protection Fencing

Tree Protection Fencing shall be installed at the perimeter of the TPZ. As a minimum the Tree Protection Fencing shall be 1.8 meters high temporary chain supported by steel stakes. This shall be fastened and supported to prevent sideways movement. The trees woody roots shall not be damaged during the installation of this Tree Protection Fencing.

This Tree Protection Fencing shall be erected prior to the commencement of works on site and shall be maintained for the duration of the construction process.

6.11 Signage

Tree Protection Signage shall be attached the the TPZ and displayed in a prominent location. These signs shall be repeated in 10m intervals or closer where the fence changes direction. These shall be a minimum of a 72 font size and each sign at-least 600 x 500mm.

6.12 Mulching

The area within the TPZ shall be mulched and maintained with 80mm of leaf litter mulch for the duration of the construction process. This mulch shall be spread by hand to limit the impact on underlying roots and shall be installed prior to the commencement of works on site.

6.13 The Site Arborist shall inspect and approve the TPZ including mulching. signage, Tree Protection Fencing, Silt fencing and Signage prior to the commencement of works on site.

6.14 Site Management

Materials and waste storage, site sheds and temporary services shall not be located within the TPZ unless specified. Storage points shall be covered when not in use and be no greater than 2m in height.

6.15 Works within the TPZ

The TPZ may need to be modified during the works to allow access between the protected tree and the proposed construction. The TPZ shall remain as specified and only those works detailed in the proposed construction undertaken.

6.16 Completion of Works within specified TPZ

Upon the completion of works within a TPZ the protective fencing shall be reinstated as specified. Where the construction of new structures does not allow for the reinstallation of fencing the TPZ shall be modified by the Site Arborist.

7.0 BIBLIOGRAPHY & REFERENCES

Barrell (1995), 'Pre-development Tree Assessments', in Trees & Building Sites, Proceedings of an International Conference Held in the Interest of Developing a Scientific Basis for Managing Trees in Proximity to Buildings, International Society of Arboriculture, Illinois, USA, pp. 132-142.

Dunster J, Smiley T, Matheny N, Lilly S (2013), Tree Risk Assessment Manual, Champaign, Illinois, International Society of Arboriculture, USA.

Harris, Clark & Matheny (1999), Arboriculture: Integrated Management of Landscape Trees, Shrubs and Vines, Prentice Hall, New Jersey.

Mattheck & Breloer (1994), The Body Language of Trees: A Handbook for Failure Analysis, The Stationary Office, London.
NSW Office of Environment and Heritage's Atlas of NSW Wildlife (2011), BioNet Atlas of NSW Wildlife.
Simon, Dormer &Hartshorne (1973), Lowson's Botany, Bell & Hyman, London.
Standards Australia (2009), Protection of Trees on Development Sites AS-4970.

Standards Australia (2007), Pruning of Amenity Trees AS-4373.
Woollahra Council (2015), Development Control Plan Chapter E3 (Tree Management). Woollahra Municipal Council (1991), Register of Significant Trees.

Figure 1 Shows the Jacarandas documented as Trees 4, 5, 6 and 7

Figure 2 Shows the included trunk development on Tree 10.

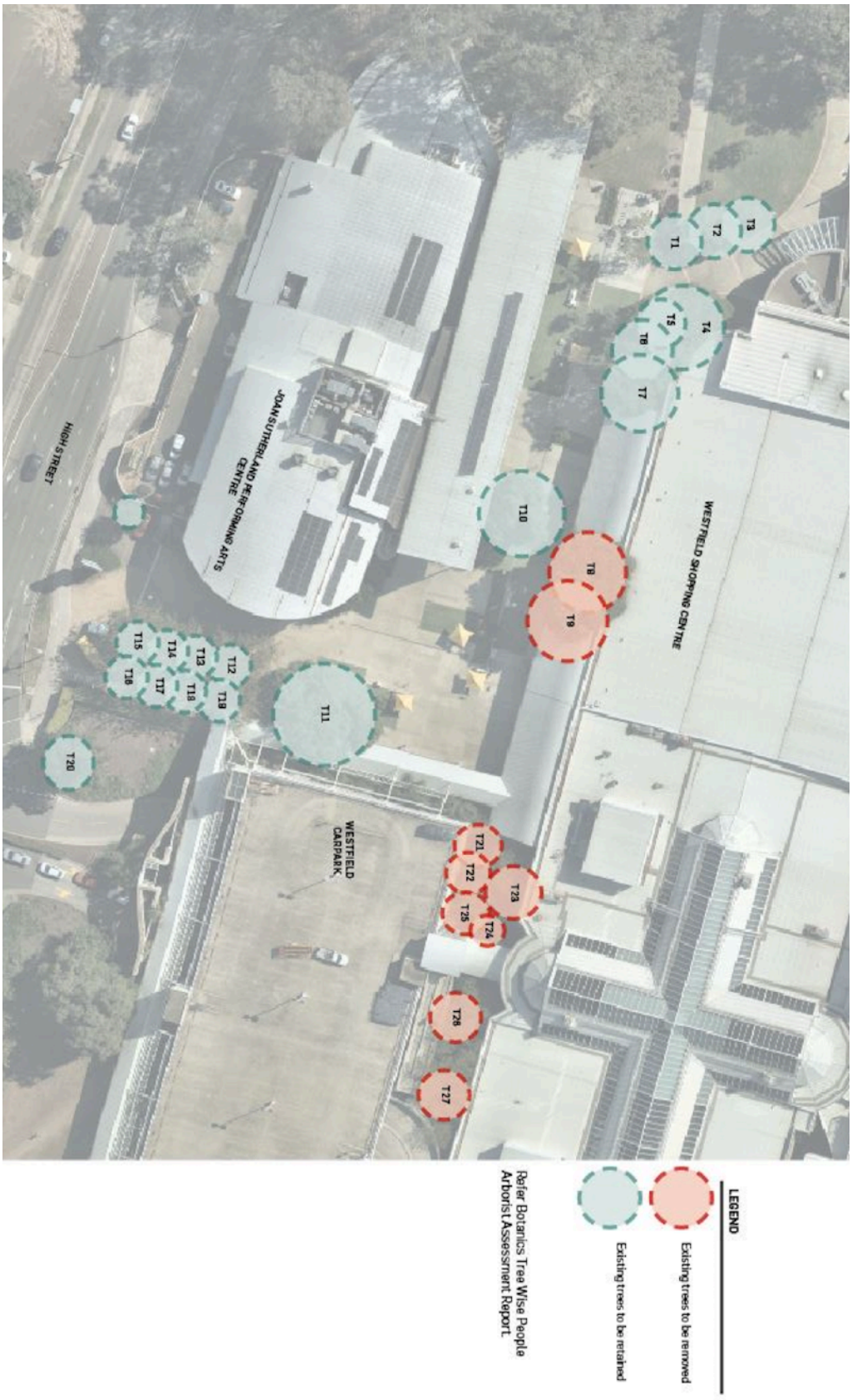

Figure 3 Shows the locations of the documented trees in relation to the existing construction footprint.