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# Arboricultural Impact Assessment
# For
# Proposed Development
# "The Terraces"
# At
# Scottish Hospital
# 2 Cooper Street
# Paddington NSW

Prepared for:

**The Presbyterian Church (NSW) Property Trust**
**c/o Cerno Management Pty Ltd**
**Suite 2, Level 4, 280 George Street**
**SYDNEY NSW 2000**

Ref: 246BAIA

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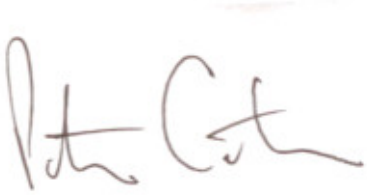

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30 September, 2010

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# 1. BACKGROUND

## 1.1 INTRODUCTION

**1.1.1** This Arboricultural Impact Assessment (AIA) was prepared for the Presbyterian Church (NSW) Property Trust in relation to proposed development at 2 Cooper Street Paddington, the Scottish Hospital (the subject site).

**1.1.2** The Architects for the project are JPR Architects in collaboration with Flower and Samios. The Heritage Architect is Conybeare Morrison International Pty Ltd. The Landscape Architect is Aspect Studios.

**1.1.3** The purpose of this AIA is to describe the existing trees on and adjacent to the subject site and to assess the impact of the proposed development on these trees. Preliminary advice (Ref: 246B-20009PrelimComment, Nov.09) has been provided to the client to give arboricultural guidelines for development layout. This Preliminary advice incorporated a verification of existing tree data, tagging (numbering) of trees and included Tree Protection Zone (TPZ) radii and ©Retention Index of each assessed tree.

**1.1.4** This AIA will assist in the preparation of the Environmental Assessment forming part of the Project Application.

**1.1.5** Australian Standard *AS4970-2009 Protection of trees on development sites* has been used as a benchmark in the preparation of this report.

## 1.2 THE SUBJECT SITE

**1.2.1** The subject site was bounded by Cooper Street to the south, Brown Street to the west, Stephen Street to the east and a public park to the north. The surrounding properties are within residential zonings. Refer to the *Detail Survey Plan of the Scottish Hospital Paddington* Sheets 1-4 dated September 2001 and June/July, 2006 prepared by Clement & Reid for further detail of existing site features.

**1.2.2** The subject site had a gentle northerly aspect, falling from a high point of 30.41 at top of kerb at the corner of Cooper Street and Stephen Street, to a low point of 13.27 at top of kerb adjacent to the north-eastern corner of the property. There was a level driveway entrance leading to a carpark to the northeast of the existing 4 storey nursing home. The lawn area to the north of the carpark was relatively level and is likely to have been filled during the former development on the site. The Heritage-listed Scottish Hospital building is located in the south-eastern corner of the site.

**1.2.3** A significant feature of the site is the heavy, woody weed invasion and a general lack of grounds maintenance undertaken clear of the functioning buildings, over recent years. Woody weeds have completely dominated many of the open spaces and are causing damage to existing structures.

**1.2.4** The pre-development Soil Landscape[1] for the site is Gymea (*gy*) characterised by undulating to rolling rises and low hills on Hawkesbury Sandstone. Sandstone outcrops were observed in the southwestern corner of the site in the vicinity of Tree 100.

[1] **Chapman, G.A. and Murphy, C.L.** (1989). *Soil Landscapes of the Sydney 1:100000 Sheet. Soil Conservation Service of NSW, Sydney.*

**1.2.5** Refer to the geotechnical report prepared by Douglas Partners for further detail of the site geology and soil depths across the site.

**1.2.6** Site soils are likely to have been significantly altered due to earlier site development. There was no remnant vegetation on the site, typical of that found on this soil landscape.

## 1.3 THE SUBJECT TREES

**1.3.1** The general findings and data collected for each of the subject trees are contained in Tree Schedule (Attachment A).

**1.3.2** There were seven trees within the site included on the Woollahra Significant Tree Register. Similar trees are described at in the listing for 2 Cooper Street, Paddington on *Schedule 3, Heritage Items of the Woollahra LEP 1995*. Three Moreton Bay Figs are referred to (rather than two as listed on the Significant Tree Register) and the Kauri Pine (T119) is not referred to. The LEP listing does not describe the location or identification number of the included trees. No Moreton Bay Figs are proposed to be removed as part of the subject works and the Kauri Pine (T119) is also to be retained.

**1.3.3** All assessed trees are protected under the Woollahra Council Tree Preservation Order (TPO)[2] as the subject site is a Heritage Item listed on the LEP. If the site was not a Heritage Item a large percentage of the assessed trees would be exempt species as listed at Clause 6.1 (g) of the TPO.

**1.3.4** Port Jackson Fig, *Ficus rubiginosa* (Tree 9) was uprooted during a windstorm in the first week of August, 2010. Although this tree was not Heritage listed, it was rated as ©Retention Value A. Some drawings may still show Tree 9.

## 1.4 THE PROPOSAL

**1.4.1** The proposed development is for demolition of the existing four storey Nursing Home building adjacent to Brown Street, the two and three storey building adjacent to Stephen Street. refurbishment of the original Scottish Hospital building fronting Cooper Street and construction of new aged care buildings, as detailed in the JPRA architecturals dated 7.09.10.

**1.4.2** The recommendations and comments in this Report assume the following:

- A high quality, shady, outdoor environment is desired.
- The amenity of the adjoining neighbours needs to be considered.
- The quality of the landscaped environment is to be enhanced.
- Existing heritage landscape character should be retained where possible through the retention of existing significant trees.

[2] Woollahra Council Tree Preservation Order 2006 applies to any tree or palm, with a height equal to or exceeding five (5) metres or a diameter spread of branches greater than 3 metres. Exemptions are listed at Clause 6. Exempt species are listed at Clause 6.1 (g). Exempt species are however protected on Heritage Items.

# 2. METHODOLOGY

## 2.1 DATA COLLECTION

**2.1.1** In preparation of this Report a ground level visual tree assessment (VTA)[3] was undertaken on 4th November, 2009 to verify previously collected tree data. Subsequent site inspections have been undertaken on 7th and 26th August and 2nd September, 2010 to verify specific tree information. No aerial (climbing) inspections, woody tissue testing or tree root mapping were undertaken as part of these assessments.

**2.1.2** Attachment C provides definition of terms used in this Report.

**2.1.3** Tree heights were estimated. Trunk diameter at breast height (DBH) was measured at 1.4 metres above ground level and rounded to the nearest 0.1 metre. Structural Root Zones (SRZ) and Tree Protection Zone (TPZ) were also rounded to the nearest 0.5 metre.

**2.1.4** All tree offsets mentioned in this Report are to centre of trunk unless otherwise stated.

## 2.2 IDENTIFICATION OF SUBJECT TREES

**2.2.1** The one hundred and forty four (144) assessed trees are those indicated on the Tree Protection Plan (adapted Level 01 Plan with Trees, DA122, Issue P11, prepared by JPRA).

**2.2.2** The subject trees were numbered and labelled on site with white plastic tags as per the Tree Schedule (Attachment A) and Tree Protection Plan (Attachment E). The tree numbering system replaces any previous numbering systems associated with previous development Applications.

## 2.3 DOCUMENTS AND PLANS REFERENCED

**2.3.1** The conclusions and recommendations in this Report are based on the *AS4970-2009 Protection of trees on development sites*, the findings from the site inspections, discussions with JPRA Architects and Cerno Management representatives and analysis of the following Plans:

- Plan of the Scottish Hospital Paddington Sheets 1-4 dated October 2009 prepared by Project Surveyors.
- JPRA Architecturals, Issue P11, 7.09.10.
- Landscape Plans, 10034, Sk01- Sk07, Rev.01, Aspect Studios.
- Hydraulic Services, N10926-DA-H00/01 – DA-H03/01, Cardno ITC.

The Draft Concept Plan SK01 and Survey have been used as a base map for the Tree Protection Plan (Attachment E).

[3] VTA – Visual Tree Assessment, undertaken by tree professionals, is a recognised (International Society of Arboriculture, Journal of Arboriculture, Vol. 22 No. 6, Nov. 1996) systematic method of identifying tree characteristics and hazard potential. VTA is also an assessment method described by Claus Mattheck in *The Body Language of Trees – A handbook for failure analysis*. The Stationary Office, London (1994)

**2.3.2** Hydraulic Services drawings N10926-DA-H00/01 – DA-H03/01 by Cardno ITC were reviewed as part of this assessment. Refer to 4.5.1 for recommendations in relation to stormwater drainage works.

## 2.4 AUSTRALIAN STANDARD AS4970-2009

**2.4.1** The Australian Standard *AS 4970–2009 Protection of trees on development sites* has been used as a benchmark in the preparation of this report. The terminology and impact assessment methodology have been adopted from this document. This Arboricultural Impact Assessment (AIA) complies with *2.3.5 Arboricultural Impact Assessment* of AS4970-2009.

**2.4.2** Recommendations have been based on tree ©Retention Value, Vigour, Condition, SULE and construction offsets (refer to Attachment C). Trees with ©Retention Value "A" should be given greater priority for retention than trees with ©Retention Value "C". Trees with Long (40 years +) SULE should be given greater priority for retention than trees with Short (5-15 years) SULE (refer to Attachment C).

**2.4.3** Tree Protection Zone (TPZ) and Structural Root Zone (SRZ) are as per *Section 3* of AS 4970-2009 and are defined at Attachment C of this report.

**2.4.4** "Construction" for the purpose of this AIA means excavation (greater than 100mm), compacted fill or machine trenching[4]. "Excavation" includes cut batters, boxing–out for the various pavement types, trenching for utilities and footings for retaining walls.

**2.4.5** Trees within proposed construction footprints are recommended for removal (**Rm**).

**2.4.6** Where construction is proposed within Structural Root Zone (SRZ) offsets, those trees have been similarly recommended for removal (**Rm**). Fully elevated, pier and beam type construction or hand dug services trenches (or horizontal boring) is however possible within a SRZ.

**2.4.7** Trees with greater than 25% of the Tree Protection Zone (TPZ) impacted by construction are recommended for removal (**Rm**). There are however different types of construction incursions proposed (e.g. fill, cut, services, pavement type, retaining walls) with varying tree impacts likely. Existing constraints to root development also varied, some trees (e.g. Kauri Pine, Tree 119) had existing buildings in similar locations to that proposed. Compacted fill can be equally as damaging to tree longevity: root development is restricted within heavily compacted soils.

**2.4.8** Trees to be retained with construction impacting less than 25% of the TPZ area were rated as Retain Plus (**R+**). Specific construction monitoring will be required for the Retain Plus (**R+**) trees (refer to Recommendations). All trees retained with TPZ encroachments must have a similar contiguous area available post-development for new root development.

**2.4.9** Where construction is proposed beyond the TPZ, those trees are rated as Retain (**R**) with no specific tree protection design or tree protection monitoring required (refer to Attachment D).

[4] "Construction" is equivalent to "works" as defined at 1.4.9 of AS4970-2009.

# 3. SUMMARY AND CONCLUSIONS

## 3.1 SUMMARY

**3.1.1** The subject site was heavily invaded with woody weed species which dominated natural regrowth and desirable tree species on the site. The current layout and landscape design are responsive to the vegetative constraints of the site.

**3.1.2** All Heritage listed trees are to be retained and the majority (88%) of the ©Retention Value A trees are to be retained and one is to be transplanted. Almost half (47%) of the ©Retention Value B trees are to be retained and a further three are to be transplanted. Most of the trees being removed are of low quality ©Retention Value C and D trees.

## 3.2 THE ©RETENTION VALUE OF SUBJECT TREES

**3.2.1** Using the TWM ©Retention Index, the subject trees were given a ®Retention Value as outlined in Table 1 below. The trees which require or are recommended for removal with this proposal are highlighted in **bold** and underlined. Palms to be transplanted are indicated as (T), following the tree number.

**Table 1: ©Retention Value of the Subject Trees**

| ©Retention Value A (Tree Number) | ©Retention Value B (Tree Number) | ©Retention Value C (Tree Number) | ©Retention Value D (Tree Number) |
|---|---|---|---|
| 1, 4, 6, 18, **72,** 76, 81, 100, 104, 105, 110(T), 119, 122, 127, 130, 143, 144 | 2, 3, 5, 7, 8, **10, 11, 12, 13, 17,** 20, 23, 28, **31,** 33, **34, 35, 36, 37, 38, 40, 41, 42, 45, 46,** 47(T), **50, 51, 52, 56, 63, 64, 68,** 69, **71, 73,** 79, 80, **84, 87, 88,** 89, 91, 93, **95**, 101,107, 108,**111, 112, 113, 114,** 117, 126, 128(T), 129(T), 133, **134,** 136, 137, 141, 142 | **14, 15, 16,** 19, **21,** 22, **24, 25, 26, 27, 29, 30, 32, 39, 43, 44, 48, 49, 53, 54, 55, 57, 58, 59, 60, 61, 62, 65, 66, 67, 70,** 74, 75, **77, 78, 82, 83, 85,** 86 (T), **90,** 92, **94, 97, 98, 99, 102, 103,** 106, **109, 115,** 118, 120, 121, **123, 124,** 125, **131, 132, 135, 139, 140** | **9, 96, 116** |
| **Total: 17<br>Retain: 15 (88%)<br>Remove: 1<br>Transplant: 1** | **Total: 62<br>Retain: 29 (47%)<br>Remove: 33<br>Transplant: 3** | **Total: 62<br>Retain: 11 (18%)<br>Remove: 51<br>Transplant: 1** | **Total: 3<br>Retain: 0 (0%)<br>Remove: 3** |

## 3.3 TREE RETENTION

**3.3.1** Of the one hundred and forty four (144) assessed trees, fifty one (51) can be retained. All the Heritage listed trees (Trees: 6, 18, 81, 100, 105, 119 and 122) are to be retained. Fifteen of the seventeen ©Retention Value A trees are to be retained. Twenty nine of the sixty two ©Retention Value B trees are to be retained.

**3.3.2** Of these fifty one (51) retained trees, thirty one (31) have been rated as *R*+ meaning a level of encroachment is proposed within the Tree Protection Zone. Twenty (20) trees are rated as *R* meaning no TPZ encroachment is proposed. The *R*+ trees will require specific tree protection and monitoring during construction. Refer to the Tree Schedule (Attachment A) for specific tree numbers.

**3.3.3** The specific tree protection requirements for the *R*+ trees are outlined at **4.2** and at Attachment D. These requirements will need to be implemented during construction to facilitate the long term survival.

## 3.4 TRANSPLANTATION

**3.4.1** Five palms (Trees: 47, 86, 110, 128 and 129) which are located within proposed construction zones, are to be transplanted to alternate locations within the site. The landscape zone fronting Stephen Street would be a suitable location. No Canary Island Date Palms, *Phoenix canariensis* are proposed to be transplanted given their propensity to spread as weeds. Temporary off-site storage and maintenance may be required given construction constraints.

## 3.5 TREE REMOVAL

**3.5.1** Of the one hundred and forty four (144) assessed trees, eighty eight (88) are recommended for removal.

**3.5.2** Of these eighty eight (88) trees, three (3) were ©Retention Value D (dead, dying or dangerous), seventy one (71) were within construction zones and fourteen (14) whilst clear of construction, were weed species and are to be removed and replanted with more appropriate species.

# 4. RECOMMENDATIONS FOR TREE MANAGEMENT

## 4.1 ARBORIST INVOLVEMENT

**4.1.1** Further arboricultural assessment will be required for the Construction Certificate documentation.

**4.1.2** An Arborist (the Project Arborist) with minimum AQF Level 5 qualifications should be engaged prior to the commencement of demolition work on the site. The Project Arborist will monitor and report regularly to the Principle Certifying Authority (PCA) and the Applicant on the condition and protection of the retained trees during the construction period. The Project Arborist is to monitor any excavation, machine trenching or compacted fill placed within the TPZ of any retained tree.

**4.1.3** The schedule of works for the development must acknowledge the role of the Project Arborist and the need to protect the retained trees. Sufficient notice must be given to the Arborist where his/her attendance is required. Should the proposed design change from that reviewed, additional arboricultural assessment will be required.

**4.1.4** The Project Arborist should certify tree protection measures at key stages of the construction. Copies of the certification should be sent to the PCA.

## 4.2 TREE RETENTION

**4.2.1** Refer to the Tree Schedule (Attachment A) and Tree Protection Plan (Attachment E) for listing and location of retained trees.

**4.2.2** **TPZ Construction:** The following site-specific tree protection measures are required where construction is proposed within TPZ offsets. These requirements are in addition to the Tree Protection Requirements (Generic) listed (TWMP1-TWMP-12) at Attachment D.

- Tree protection devices are to be installed prior to demolition of existing structures. Trunk battening will be required around several trees in the southwestern corner. Battening should comply with Fig. *4 of AS4970-2009*.
- All retained trees are to be numbered, clearly identified and checked by Project Arborist prior to any tree removal works.
- Tree removal is to comply with *WorkCover NSW Code of Practice for the Amenity Tree Industry 1998*. There should be no canopy pruning undertaken unless approved by the DA Consent.
- All pruning is to comply with AS4373-2007 *Pruning of Amenity Trees*.
- Tree protection fencing should be installed immediately following approved tree removal. Fencing is to comply with Fig. *3 of AS4970-2009.*
- Prohibit activities within fenced areas include: topsoil stripping, excavation, stockpiling of any building materials or site soils/rock, machinery parking, placement of site sheds (unless elevated and with suspended plumbing), machinery haul roads.
- Tree protection devices are to be incorporated into the Construction Management Plan and Sediment Control Plan.

- Timber decks and access ramps adjacent to Trees 2, 5, 6, 18, 19, 20, 89, 91, 92, 93 and 119 to be a FFLs sufficient to allow for support structures and retention of existing soil levels.
- Proposed carpark in northeastern corner to be amended (delete northern-most carpark) to allow for the retention of Canary Island Date Palm, *Phoenix canariensis* (T23)
- Port Jackson Fig, *Ficus rubiginosa* (T18) is to be pruned to allow for construction clearance adjacent RACF. Pruning works are illustrated in Photo A.
- Holm Oak, *Quercus ilex* (T81) is to be pruned to allow for construction clearance adjacent to GKL building. Pruning works are illustrated in Photo B.
- Sydney Red Gum, *Angophora costata* (T130) is to be retained adjacent to the proposed main ILU building. Selective pruning will be required given the lean towards the south. Particular care to be taken with scaffold/hoarding installation. Scaffolding is to comply with Fig. *5 of AS4970-2009.*
- Chinese Hackberry, *Celtis sinensis* (T69) and European Hackberry, *Celtis australis (*T76): retain existing retaining walls to north and west to avoid SRZ damage. Minimise grading for propose upgrade of Central Terraces.
- Piling or shoring for Basement excavation is within the canopy spread of Trees 6, 18, 81, 69, 76, 119 and 130. A two stage drilling rig may be required so as to minimise canopy pruning.
- The Tree Protection Plan (Attachment E), as amended for construction should be kept in the Site Office for the construction period.
- Scaffolding if required, is to be installed with appropriate ground protection and allowance for retention of adjacent branches as per Fig. *3 of AS4970-2009.*
- Weed-free mulch should be used (100mm deep layer) within the TPZ to buffer soil drying, compaction and contamination. High traffic zones adjacent to the building works should be mulched regularly both inside and outside tree protection fencing.
- Over-excavation or benching back towards retained trees is to be avoided with vertical shoring.
- Fill batters should be steepened or retaining walls constructed to reduce the extent of fill towards trees.
- Discontinuous, pier and beam-type footings should be used where roots greater than 50mm diameter are encountered within TPZs.
- Temporary irrigation or watercart hand watering should be used during drought periods. Project Arborist to monitor soil moisture levels and instruct watering regime.
- Services are to be routed beyond or suspended within TPZs. Where this is not possible, services are to be hand dug or bored within TPZ offsets.

## 4.3 TRANSPLANTING

**4.3.1** Refer to the Tree Schedule (Attachment A) and Tree Protection Plan (Attachment E) for listing and location of trees to be transplanted.

**4.3.2** A Transplant Method Statement and Relocation Plan is to be prepared for CC documentation to accompany the Landscape Planting Plan. Palms to be transplanted are: Trees 47, 86, 110, 128 and 129.

## 4.4 TREE REMOVAL

**4.4.1** Refer to the Tree Schedule (Attachment A) and Tree Protection Plan (Attachment E) for listing and location of trees to be removed.

**4.4.2** The tree removal is to comply with *Draft WorkCover Code of Practice for Tree Work (1998).*

**4.4.3** Port Jackson Fig, *Ficus rubiginosa* (T116) is required to be removed given its imminent hazard potential. This tree has had two major stem failures into the subject site caused by fungal decay. The remaining stems are similarly defective and overhang Brown Street. The tree was marked for removal at the meeting of 16.05.06 attended by Council's Tree Management Office and consultants for the previous DA (DA931/2001). This tree was previously known as *T21* on *Tree Location Plan TP01/E, 8.10.01*, prepared by Pittendrigh Shinkfield Bruce.

**4.4.4** The following woody weed tree species have been recommended for removal (to be replaced with other super-advanced evergreen species) despite being sufficiently clear of the proposed construction: Trees 29, 31, 32, 33, 36, 39, 44, 99, 123, 124, 131, 132, 135 and 138.

## 4.5 HYDRAULICS PLANS

**4.5.1** Hydraulic Services drawings, *N10926-DA-H00/01 – DA-H03/01*, prepared by Cardno ITC have been reviewed. Further arboricultural assessment will be required for construction drawings. The 'catch drain' indicated in the south west corner of the site may need to be amended to a dish drain to minimise TPZ encroachments. All machine trenching must be prohibited within the SRZ offsets of retained trees to facilitate their retention. The drainage design must minimise TPZ encroachments wherever possible.

## 4.6 LANDSCAPE PLANS

**4.6.1** Landscape Plans, *10034, Sk01- Sk07, Rev.01*, prepared by Aspect Studios have been reviewed. The proposed landscaping adjacent to the retained trees aims, to maintain existing soil levels, moisture and nutrient status within the TPZ. The Landscape Plans for construction should incorporate the relevant tree protection measures listed above to minimise tee impacts.

# Attachment A: Tree Schedule

## Tree Schedule - "The Terraces" - Scottish Hospital, Paddington

| TREE No. | COMMON NAME/ GENUS SPECIES | DBH (m) | HEIGHT (m) | CANOPY RADIUS (m) | AGE CLASS | VIGOUR | CONDITION | SRZ RADIUS (m) | TPZ RADIUS (m) | SULE | ©SIG RATING | ©RETENTION INDEX | RECOMMENDATION | COMMENTS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Sydney Red Gum, *Angophora costata* | 0.6, 0.4 | 18 | 7 | M | G | F | 2.8 | 8.0 | L | 2 | A | R+ | *Twin stemmed from 1 metre; orientation N-S. Three 5 metre tall Pitosporum 5m to NE. One 8 metre tall Turpentine 3 metres to N. Proposed accessway and footpath within SRZ to be at or above existing grade.* |
| 2 | Sydney Red Gum, *Angophora costata* | 0.3 | 13 | N4, S2, E4, W2 | M | G | F | 2.0 | 3.6 | M | 3 | B | R+ | *Canopy skewed to N. Footpath to be at or above existing grade.* |
| 3 | Turpentine, *Syncarpia glomulifera* | 0.4 | 15 | N5, S2, E2, W2 | M | G | F | 2.3 | 4.8 | M | 3 | B | R | *Eight metre tall Bangalow Palm 2 metres to S.* |
| 4 | Holm Oak, *Quercus ilex* | 0.6 | 13 | N8, S4, E7, W7 | M | G | G | 2.7 | 7.2 | L | 2 | A | R | *Four stems from 4 metres. Overhangs play area to the N. Remedial pruning required following failure of T9.* |
| 5 | Camphor Laurel, *Cinnamomum camphora* | 1.4 | 18 | N10, S8, E8, W8 | M | G | F | 3.8 | 15.0 | L | 3 | B | R+ | *Multi stemmed at base with dominant stems to E and W. Proposed accessway, car park and footpath within SRZ to be at or above existing grade.* |
| 6 | Weeping Lillypilly, *Waterhousia floribunda* | 0.6, 0.6, 0.5, 0.5, 0.5, 0.4 | 20 | 14 | M | G | F | 4.5 | 10.8 | L | 1 | A | R+ | *Heritage listed tree. Six stems from base. Proposed accessway and footpath within SRZ to be at or above existing grade. Vertical piling for basement required within TPZ.* |

| TREE No. | COMMON NAME/ GENUS SPECIES | DBH (m) | HEIGHT (m) | CANOPY RADIUS (m) | AGE CLASS | VIGOUR | CONDITION | SRZ RADIUS (m) | TPZ RADIUS (m) | SULE | ©SIG RATING | ©RETENTION INDEX | RECOMMENDATION | COMMENTS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7 | Sydney Red Gum, *Angophora costata* | 0.5 | 20 | N5, S7, E7, W7 | M | F | F | 2.5 | 6.0 | M | 3 | B | R | *Trunk lean to N.* |
| 8 | Sheoak, *Casuarina sp.* | 0.3 | 20 | N5, S3, E3, W1 | M | F | F | 2.0 | 3.6 | M | 3 | B | R | *Canopy skewed to N. Small Sassafras nearby.* |
| 9 | Port Jackson Fig, *Ficus rubiginosa* | | | | | | | | | | 4 | D | Rm | *Approximately fifteen stems from base. Proposed footpath within SRZ. Recently uprooted. Remove.* |
| 10 | Sydney Red Gum, *Angophora costata* | 0.3 | 15 | 4 | M | G | F | 2.0 | 3.6 | M | 3 | B | Rm | *High, drawn up canopy. Eight metre tall Pittosporum 5 metres to E. Within proposed footpath.* |
| 11 | Magenta Lillypilly, *Syzygium paniculatum* | 0.3 | 12 | N3, S5, E5, W5 | M | G | F | 2.0 | 3.6 | L | 3 | B | Rm | *Canopy skewed to S. Located within proposed outdoor terrace.* |
| 12 | Magenta Lillypilly, *Syzygium paniculatum* | 0.3 | 13 | N6, S3, E6, W6 | M | G | G | 2.0 | 3.6 | L | 3 | B | Rm | *Five metre tall Magenta Lillypilly 3 metres to E. Proposed footpath within SRZ.* |
| 13 | Camphor Laurel, *Cinnamomum camphora* | 1.3 @ 1.0m | 18 | N10, S13, E12, W12 | M | G | G | 3.7 | 15.0 | L | 3 | B | Rm | *Three stems from 2 metres of equal dominance. Roots lifting car park to W. Located within proposed building footprint. TPO* exempt when less than 10m in height.* |
| 14 | Cocos Palm, *Syagrus romanzoffianum* | 0.2 | 14 | 3 | M | G | F | 1.5 | 2.4 | M | 4 | C | Rm | *TPO* exempt species. Fourteen metre tall Cocos Palm 0.5 metre to N. Six metre tall Turpentine 3 metres to E. Located within proposed building footprint.* |
| 15 | Turpentine, *Syncarpia glomulifera* | 0.2 | 12 | 3 | SM | G | G | 1.5 | 2.4 | L | 4 | C | Rm | *Located within proposed building footprint.* |

| TREE No. | COMMON NAME/ GENUS SPECIES | DBH (m) | HEIGHT (m) | CANOPY RADIUS (m) | AGE CLASS | VIGOUR | CONDITION | SRZ RADIUS (m) | TPZ RADIUS (m) | SULE | ©SIG RATING | ©RETENTION INDEX | RECOMMENDATION | COMMENTS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 16 | Camphor Laurel, *Cinnamomum camphora* | 0.8 | 18 | N6, S15, E8, W8 | M | G | F | 3.0 | 9.6 | S | 3 | C | Rm | *Canopy skewed to S. Roots lifting car park to S. Located within proposed building footprint. TPO* exempt when less than 10m in height.* |
| 17 | Turpentine, *Syncarpia glomulifera* | 0.3 | 10 | N5, S4, E4, W2 | SM | F | F | 2.0 | 3.6 | M | 3 | B | Rm | *Yellowing, sparse foliage. Located within proposed building footprint.* |
| 18 | Port Jackson Fig, *Ficus rubiginosa* | 1.2, 1.2, 1.1, 0.9, 0.8, 0.7 | 20 | N15, S15, E18, W18 | M | G | F | 7.5 | 15.0 | L | 1 | A | R+ | *Heritage listed tree. Six stems from base. Stem to S has heavy lean outwards from tree centre. Previous stem failure to NE. Large crossing stems at 10 metres. Proposed building construction within TPZ. Pruning of southern most stem required for construction.* |
| 19 | African Olive, *Olea europaea subsp. Africana* | 0.4, 0.4 | 14 | N8, S8, E5, W7 | M | F | F | 2.7 | 6.8 | S | 3 | C | R+ | *TPO* exempt species. Twin stemmed from base; orientation E and W. Proposed fence construction within SRZ. Consider for removal as part of landscaping.* |
| 20 | Holm Oak, *Quercus ilex* | 0.7 | 16 | N8, S3, E5, W3, | M | F | F | 2.8 | 8.4 | M | 3 | B | R+ | *Fungal bracket at base. Stump of failed tree at base to W. Four stems from 3 metres. Canopy skewed to N. Proposed footpath within SRZ to be at or above existing grade.* |
| 21 | Chinese Hackberry, *Celtis sinensis* | 0.3 | 12 | 3 | M | G | F | 2.0 | 3.6 | M | 4 | C | Rm | *Multiple seedlings around base. Proposed footpath within SRZ. TPO* exempt when less than 10m in height.* |
| 22 | Chinese Hackberry, *Celtis sinensis* | 0.3 | 10 | N5, S8, E3, W1 | M | G | F | 2.0 | 3.6 | M | 4 | C | R+ | *Canopy skewed to E over road. Proposed footpath within TPZ to be at or above existing grade. Consider for removal as part of landscaping. TPO* exempt when less than 10m in height.* |
| 23 | Canary Island Date Palm, *Phoenix canariensis* | 0.7 | 13 | 3 | M | G | G | 2.0 | 5.0 | L | 3 | B | R+ | *Transplantable. Proposed car park within SRZ. Northern most carpark space to be deleted.* |

| TREE No. | COMMON NAME/ GENUS SPECIES | DBH (m) | HEIGHT (m) | CANOPY RADIUS (m) | AGE CLASS | VIGOUR | CONDITION | SRZ RADIUS (m) | TPZ RADIUS (m) | SULE | ©SIG RATING | ©RETENTION INDEX | RECOMMENDATION | COMMENTS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 24 | Chinese Hackberry, *Celtis sinensis* | 0.3 | 10 | N6, S6, E1, W0 | M | G | F | 2.0 | 3.6 | L | 4 | C | Rm | *Twin stemmed from 2 metres. Seedlings around base. Within proposed car park. TPO* exempt when less than 10m in height.* |
| 25 | Chinese Hackberry, *Celtis sinensis* | 0.3 | 11 | N5, S3, E5, W1 | M | G | F | 2.0 | 3.6 | L | 4 | C | Rm | *Canopy skewed to N. Four metre tall young Camphor Laurel 1 metre to N. Within proposed car park. TPO* exempt when less than 10m in height.* |
| 26 | Chinese Hackberry, *Celtis sinensis* | 0.4 | 12 | N3, S6, E6, W5 | M | G | F | 2.3 | 4.8 | L | 4 | C | Rm | *Canopy skewed to E. Within proposed car park. TPO* exempt when less than 10m in height.* |
| 27 | African Olive, *Olea europaea subsp. Africana* | Multi | 10 | N7, S3, E7, W7 | M | F | P | 3.0 | 9.6 | S | 4 | C | Rm | *TPO* exempt species. Hazardous stem to N overhanging fence and street. Deadwood throughout canopy. Within proposed car park.* |
| 28 | Jacaranda, *Jacaranda mimosifolia* | 0.3 | 9 | N7, S3, E4, W5 | M | F | F | 2.0 | 3.6 | M | 3 | B | R+ | *Basal cavity to E. Sparse foliage. Proposed building within TPZ. Protect trunk if fencing cannot be provided within work zone.* |
| 29 | Chinese Hackberry, *Celtis sinensis* | 0.3 | 10 | N6, S2, E6, W6 | M | F | F | 2.0 | 3.6 | M | 4 | C | Rm | *Four X 10 metres tall Chinese Hackberry to the N and E. Proposed footpath and fence construction within SRZ. Remove and replant with evergreen tree.* |
| 30 | Native Daphne, *Pittosporum undulatum* | 0.1, 0.1 | 8 | N5, S1, E3, W4 | M | G | F | 1.5 | 2.0 | M | 4 | C | Rm | *Proposed fence construction within SRZ. Proposed footpath within TPZ. Remove and replant with more suitable evergreen tree.* |

| TREE No. | COMMON NAME/ GENUS SPECIES | DBH (m) | HEIGHT (m) | CANOPY RADIUS (m) | AGE CLASS | VIGOUR | CONDITION | SRZ RADIUS (m) | TPZ RADIUS (m) | SULE | ©SIG RATING | ©RETENTION INDEX | RECOMMENDATION | COMMENTS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 31 | Chinese Hackberry, *Celtis sinensis* | 0.5 | 17 | N12, S5, E10, W8 | M | G | F | 2.5 | 6.0 | L | 3 | B | Rm | *Canopy skewed to NE over road. Proposed fence construction within SRZ. Basement within TPZ. TPO* exempt when less than 10m in height. Remove and replant with evergreen tree.* |
| 32 | Chinese Hackberry, *Celtis sinensis* | 0.3 | 15 | N5, S3, E2, W8 | M | G | F | 2.0 | 3.6 | L | 4 | C | Rm | *Canopy skewed over road. Proposed fence construction within SRZ. Basement within TPZ. TPO* exempt when less than 10m in height. Remove and replant with evergreen tree.* |
| 33 | Chinese Hackberry, *Celtis sinensis* | 0.4 | 16 | N5, S3, E12, W3 | M | G | F | 2.3 | 4.8 | L | 3 | B | Rm | *Canopy skewed over road. Proposed fence construction within SRZ. Basement within TPZ. TPO* exempt when less than 10m in height. Remove and replant with evergreen tree.* |
| 34 | Canary Island Date Palm, *Phoenix canariensis* | 0.7 | 9 | 4 | SM | G | G | 2.0 | 5.0 | L | 3 | B | Rm | *Dead lower fronds. Located within proposed building footprint.* |
| 35 | Brushbox, *Lophostemon confertus* | 0.5 | 17 | 6 | M | G | F | 2.5 | 6.0 | L | 3 | B | Rm | *Overhead service wires near canopy to E. Proposed basement within SRZ. Remove and replant with evergreen tree.* |
| 36 | Camphor Laurel, *Cinnamomum camphora* | 0.5 | 17 | N4, S12, E4, W2 | M | G | F | 2.5 | 6.0 | M | 3 | B | Rm | *Canopy skewed to E. Overhead service wires near canopy to E. Proposed basement within SRZ. Possible demolition of existing footpath within SRZ. Remove and replant with more suitable evergreen tree.* |
| 37 | Camphor Laurel, *Cinnamomum camphora* | 1.0 | 19 | 8 | M | G | F | 3.3 | 12.0 | M | 3 | B | Rm | *Twin stemmed from 2 metres. Proposed basement within SRZ. TPO* exempt when less than 10m in height.* |
| 38 | Magenta Lillypilly, *Syzygium paniculatum* | 0.3 | 14 | 5 | M | G | G | 2.0 | 3.6 | L | 3 | B | Rm | *Slight canopy skewed to NW. Located within proposed building footprint.* |
| 39 | Coral Tree, *Erythrina x sykesii* | 0.4 | 14 | N5, S8, E3, W1 | M | G | F | 2.3 | 4.8 | S | 4 | C | Rm | *Canopy skewed to E. Five metre Coral Tree 2 metres to the S. Proposed building within TPZ. TPO* exempt when less than 10m in height. Remove and replant with evergreen tree.* |

| TREE No. | COMMON NAME/ GENUS SPECIES | DBH (m) | HEIGHT (m) | CANOPY RADIUS (m) | AGE CLASS | VIGOUR | CONDITION | SRZ RADIUS (m) | TPZ RADIUS (m) | SULE | ©SIG RATING | ©RETENTION INDEX | RECOMMENDATION | COMMENTS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 40 | Chinese Hackberry, *Celtis sinensis* | 0.3 | 17 | N8, S3, E1, W5 | M | G | F | 2.0 | 3.6 | L | 3 | B | Rm | *Heavy canopy skewed to W. Canopy contact with existing building. Proposed building and accessway within SRZ. TPO* exempt when less than 10m in height. Remove and replant with evergreen tree.* |
| 41 | Chinese Hackberry, *Celtis sinensis* | 0.4 | 17 | N4, S8, E2, W5 | M | G | F | 2.3 | 4.8 | L | 3 | B | Rm | *Canopy skewed to N. Proposed building and accessway within SRZ. TPO* exempt when less than 10m in height. Remove and replant with evergreen tree.* |
| 42 | Chinese Hackberry, *Celtis sinensis* | 0.4 | 17 | N3, S3, E5, W5 | M | G | F | 2.3 | 4.8 | L | 3 | B | Rm | *Located within proposed accessway. TPO* exempt when less than 10m in height. Remove and replant with evergreen tree.* |
| 43 | Coral Tree, *Erythrina x sykesii* | 0.6, 0.4 | 17 | N3, S7, E6, W6 | M | G | F | 3.0 | 9.6 | S | 3 | C | Rm | *Twin stemmed from base. Proposed building and accessway within SRZ. TPO* exempt when less than 10m in height.* |
| 44 | Coral Tree, *Erythrina x sykesii* | 0.4 | 15 | N3, S8, E8, W2 | M | G | P | 2.3 | 4.8 | S | 3 | C | Rm | *Canopy skewed to SE. Proposed building and accessway within SRZ. TPO* exempt when less than 10m in height. Remove and replant with evergreen tree.* |
| 45 | Camphor Laurel, *Cinnamomum camphora* | 0.3, 0.3, 0.3, 0.1 | 14 | 6 | M | G | F | 2.5 | 6.0 | M | 3 | B | Rm | *Three stems from base of equal dominance. Located within proposed building footprint. TPO* exempt when less than 10m in height.* |
| 46 | Chinese Hackberry, *Celtis sinensis* | 0.3 | 15 | N8, S1, E4, W5, | SM | G | F | 2.0 | 3.6 | L | 3 | B | Rm | *Canopy skewed to N. Located within proposed building footprint. TPO* exempt when less than 10m in height.* |
| 47 | Cotton Palm, *Washingtonia robusta* | 0.4 | 14 | 2 | M | G | F | 2.3 | 4.8 | M | 3 | B | T | *Canopy slightly skewed to N. Located within proposed building footprint.* |

| TREE No. | COMMON NAME/ GENUS SPECIES | DBH (m) | HEIGHT (m) | CANOPY RADIUS (m) | AGE CLASS | VIGOUR | CONDITION | SRZ RADIUS (m) | TPZ RADIUS (m) | SULE | ©SIG RATING | ©RETENTION INDEX | RECOMMENDATION | COMMENTS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 48 | Brown Pine, *Podocarpus elatus* | 0.5, 0.4, 0.3 | 14 | N8, S8, E3, W5 | M | G | P | 2.1 | 8.4 | S | 3 | C | Rm | *Cavities at base to E and W. Located within proposed building footprint.* |
| 49 | Jacaranda, *Jacaranda mimosifolia* | 0.3, 0.2 | 14 | N10, S3, E1, W4 | M | G | F | 2.3 | 4.8 | S | 3 | C | Rm | *Canopy skewed to N. Located within proposed building footprint.* |
| 50 | Chinese Hackberry, *Celtis sinensis* | 0.6 | 17 | N12, S5, E5, W10 | M | G | F | 2.7 | 7.2 | M | 3 | B | Rm | *Twin stemmed from 1.2 metre. Canopy skewed to N. Located within proposed building footprint. TPO* exempt when less than 10m in height.* |
| 51 | Brushbox, *Lophostemon confertus* | 0.5, 0.3 | 17 | 6 | M | F | F | 2.8 | 8.4 | M | 3 | B | Rm | *Previously topped at 8 metres. Located within proposed building footprint.* |
| 52 | Canary Island Date Palm, *Phoenix canariensis* | 0.5 | 15 | 3 | M | G | G | 2.0 | 5.0 | M | 3 | B | Rm | *Located within proposed building footprint.* |
| 53 | African Olive, *Olea europaea subsp. Africana* | 0.3, 0.3, 0.2 | 11 | N8, S2, E3, W6 | M | G | P | 2.5 | 6.0 | M | 4 | C | Rm | *TPO* exempt species. Three stems from base. Canopy heavily skewed to N. Deadwood throughout canopy. Within proposed Dementia Courtyard.* |
| 54 | African Olive, *Olea europaea subsp. Africana* | 0.3 | 12 | N5, S8, E1, W6 | M | G | F | 2.0 | 3.6 | M | 4 | C | Rm | *TPO* exempt species. Canopy skewed to W. Deadwood throughout canopy. Within proposed Dementia Courtyard.* |
| 55 | Forest Sheoak, *Allocasuarina torulosa* | 0.2 | 14 | 2 | SM | F | F | 1.7 | 2.4 | M | 4 | C | Rm | *Deadwood in lower canopy. Located within proposed basement.* |
| 56 | Jacaranda, *Jacaranda mimosifolia* | 0.3, 0.2 | 13 | 6 | M | F | F | 2.3 | 4.8 | M | 3 | B | Rm | *Twin stemmed from 1 metre. Located within proposed basement.* |

| TREE No. | COMMON NAME/ GENUS SPECIES | DBH (m) | HEIGHT (m) | CANOPY RADIUS (m) | AGE CLASS | VIGOUR | CONDITION | SRZ RADIUS (m) | TPZ RADIUS (m) | SULE | ©SIG RATING | ©RETENTION INDEX | RECOMMENDATION | COMMENTS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 57 | Jacaranda, *Jacaranda mimosifolia* | 0.3 | 13 | N6, S2, E4, W3 | SM | F | F | 2.0 | 3.6 | M | 4 | C | Rm | *Canopy skewed to N. Located within proposed basement.* |
| 58 | Cocos Palm, *Syagrus romanzoffianum* | 0.3 | 14 | 4 | M | G | G | 1.5 | 3.6 | M | 4 | C | Rm | *TPO* exempt species. Located within proposed basement.* |
| 59 | Cocos Palm, *Syagrus romanzoffianum* | 0.3 | 14 | 3 | M | G | G | 1.5 | 3.6 | M | 4 | C | Rm | *TPO* exempt species. Located within proposed basement.* |
| 60 | Cocos Palm, *Syagrus romanzoffianum* | 0.2, 0.2 | 14 | 3 | M | G | G | 1.5 | 3.6 | M | 4 | C | Rm | *TPO* exempt species. Twin stemmed from base, orientation E and W. Located within proposed basement.* |
| 61 | Swamp Sheoak, *Casuarina glauca* | 0.3 | 15 | 4 | M | F | F | 2.0 | 3.6 | M | 4 | C | Rm | *Drawn up crown conflicting with Cocos Palms adjacent. Located within proposed basement.* |
| 62 | Sydney Red Gum, *Angophora costata* | 0.3 | 14 | N6, S1, E4, W4 | M | F | F | 2.0 | 3.6 | M | 4 | C | Rm | *Canopy skewed to N. Located within proposed basement.* |
| 63 | Swamp Sheoak, *Casuarina glauca* | 0.4 | 17 | 4 | M | G | G | 2.3 | 4.8 | M | 3 | B | Rm | *Located within proposed basement.* |
| 64 | Swamp Sheoak, *Casuarina glauca* | 0.3 | 16 | N3, S3 , E3, W5 | M | F | F | 2.0 | 3.6 | M | 3 | B | Rm | *Drawn up, high canopy with skewed to W. Located within proposed basement.* |
| 65 | Willow Bottlebrush, *Callistemon salignus* | 0.2 | 8 | N5, S1, E2, W4 | SM | F | F | 1.7 | 2.4 | M | 4 | C | Rm | *Heavy canopy skewed to N. Located within proposed basement.* |
| 66 | Swamp Sheoak, *Casuarina glauca* | 0.4 | 15 | N6, S3, E2, W7 | M | F | F | 2.3 | 4.8 | S | 4 | C | Rm | *Canopy skewed to N. Located within proposed basement.* |

| TREE No. | COMMON NAME/ GENUS SPECIES | DBH (m) | HEIGHT (m) | CANOPY RADIUS (m) | AGE CLASS | VIGOUR | CONDITION | SRZ RADIUS (m) | TPZ RADIUS (m) | SULE | ©SIG RATING | ©RETENTION INDEX | RECOMMENDATION | COMMENTS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 67 | Giant Bird of Paradise, *Strelitzia nicolai* | Multi | 9 | 4 | M | F | F | 1.5 | 6.0 | M | 4 | C | Rm | *Clump of approximately 12 stems . Nine metres tall Forest Sheoak growing from within clump. TPZ to be taken from centre of clump. Located within proposed basement.* |
| 68 | Sydney Red Gum, *Angophora costata* | 0.3 | 14 | N2, S5, E5, W5 | SM | G | G | 2.0 | 3.6 | L | 3 | B | Rm | *Specimen of long term potential. Located within proposed basement.* |
| 69 | Chinese Hackberry, *Celtis sinensis* | 0.6, 0.5 | 16 | N12, S8, E9, W10 | M | G | F | 3.2 | 10.8 | L | 2 | B | R+ | *Twin stemmed from base, orientation N and S. Slight canopy skew to N. Pruned to S. Proposed basement within TPZ. Canopy to be protected during piling, garding and terracing . TPO* exempt when less than 10m in height.* |
| 70 | Port Jackson Fig, *Ficus rubiginosa* | 0.2, 0.1, 0.1 | 8 | 4 | SM | G | F | 2.0 | 3.6 | L | 4 | C | Rm | *Three stems from base. Previously canopy lifted. Recent planting. Proposed retaining wall within SRZ.* |
| 71 | Chinese Hackberry, *Celtis sinensis* | 0.4, 0.3 | 16 | N8, S7, E4, W8 | M | G | F | 2.7 | 7.2 | L | 3 | B | Rm | *Bougainvillea growing throughout lower canopy. Within proposed Demtia Courtyard. TPO* exempt when less than 10m in height.* |
| 72 | Hoop Pine, *Araucaria cunninghamii* | 0.8 | 20 | 6 | M | G | G | 3.0 | 9.6 | L | 1 | A | Rm | *Canopy contact with existing building. Located within building footprint.* |
| 73 | Chinese Hackberry, *Celtis sinensis* | 0.4 | 16 | N4, S10, E5, W8 | M | G | F | 2.3 | 4.8 | L | 3 | B | Rm | *Bougainvillea growing throughout lower canopy. Canopy skewed to S. Within proposed Dementia Courtyard. TPO* exempt when less than 10m in height.* |
| 74 | Cocos Palm, *Syagrus romanzoffianum* | 0.3 | 12 | 3 | M | G | G | 1.5 | 3.6 | M | 4 | C | R | *TPO* exempt species. Consider for removal if not part of heritage landscape.* |
| 75 | Cocos Palm, *Syagrus romanzoffianum* | 0.3 | 9 | 3 | M | G | G | 1.5 | 3.6 | M | 4 | C | R+ | *TPO* exempt species. Possible demolition of existing retaining wall within TPZ. Consider for removal if not part of heritage landscape.* |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 76 | European Hackberry, *Celtis australis* | 0.7 | 15 | N9, S9, E10, W8 | M | G | F | 2.8 | 8.4 | L | 2 | A | R+ | *Twin stemmed from 2m. Canopy overhangs existing building to W. Retain existing retaining wall to avoid SRZ excavation. Protect crown during demolition. TPO* exempt when less than 10m in height.* |
| 77 | Canary Island Date Palm, *Phoenix canariensis* | 0.7 | 5 | 4 | IM | G | G | 2.0 | 5.0 | L | 4 | C | Rm | *Remove to favour adjacent Celtis.* |
| 78 | Canary Island Date Palm, *Phoenix canariensis* | 0.7 | 5 | 5 | IM | G | G | 2.0 | 5.0 | L | 4 | C | Rm | *Remove to favour adjacent Celtis.* |
| 79 | Kentia Palm, *Howea forsteriana* | 0.1 | 8 | 2 | M | G | G | 1.5 | 2.0 | L | 3 | B | R+ | *Slight trunk lean to N. May need to be transplanted due to construction zone.* |
| 80 | Cotton Palm, *Washingtonia robusta* | 0.4 | 15 | 2 | M | G | G | 2.0 | 4.8 | M | 3 | B | R+ | *Crack in bark to E. Conflicting with canopy of Holm Oak (T81) to W. Protect during demolition.* |
| 81 | Holm Oak, *Quercus ilex* | 0.9, 0.8 | 17 | N12, S12, E8, W15 | M | G | F | 5.0 | 15.0 | L | 1 | A | R+ | *Heritage listed tree. Twin stemmed from base, orientation N and S. Third stem to S previously removed. Heavy canopy skewed to W. Proposed building within TPZ. Possible demolition works within SRZ. Crown pruning of approximately 20% to allow for building.* |
| 82 | African Olive, *Olea europaea subsp. Africana* | 0.3 | 15 | N5, S1, E4, W4 | M | G | F | 2.0 | 3.6 | L | 4 | C | Rm | *TPO* exempt species. Canopy skewed to N over building. Suppressed upright form. Proposed basement within SRZ.* |
| 83 | Chinese Hackberry, *Celtis sinensis* | 0.3 | 15 | N6, S1, E2, W4 | M | G | F | 2.5 | 3.6 | L | 4 | C | Rm | *Canopy skewed to N over existing building. Proposed ramp within SRZ. TPO* exempt when less than 10m in height.* |
| 84 | Chinese Hackberry, *Celtis sinensis* | 0.3, 0.3 | 15 | N8, S2, E2, W8 | M | G | F | 2.5 | 6.0 | L | 3 | B | Rm | *Canopy skewed to NW. Twin stemmed from base. Celtis seedlings adjacent. Proposed ramp within SRZ. TPO* exempt when less than 10m in height.* |
| 85 | Sengal Date Palm, *Phoenix reclinata* | Multi | 8 | 4 | M | G | P | 2.5 | 5.0 | M | 4 | C | Rm | *Clump of six. Three stems recently failed. Located within proposed building footprint.* |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 86 | Bangalow Palm, *Archontophoenix cunninghamiana* | 0.2 | 12 | 3 | M | G | G | 1.5 | 2.4 | M | 4 | C | T | *Proposed building within SPZ. Transplant on site.* |
| 87 | Chinese Hackberry, *Celtis sinensis* | 0.6, 0.4 | 18 | N10, S10, E6, W6 | M | G | F | 3.0 | 9.6 | L | 3 | B | Rm | *Twin stemmed from base orientation E and W. Ivy throughout canopy. Located within proposed building footprint. TPO* exempt when less than 10m in height.* |
| 88 | Camphor Laurel, *Cinnamomum camphora* | 0.5 | 15 | N5, S5, E8, W0 | M | G | F | 2.5 | 6.0 | L | 3 | B | Rm | *Canopy skewed to SE. Five metre tall Chinese Hackberry 1 metre to the NW. Proposed building within SRZ. TPO* exempt when less than 10m in height.* |
| 89 | Camphor Laurel, *Cinnamomum camphora* | 0.8 | 17 | N5, S9, E9, W5 | M | G | F | 3.0 | 9.6 | L | 3 | B | R+ | *Three stems from 3m. Proposed building within TPZ. May need to be removed for proposed substation and pathways. Significant crown pruning required. TPO* exempt when less than 10m in height.* |
| 90 | Chinese Hackberry, *Celtis sinensis* | 0.3 | 10 | 6 | SM | F | F | 2.0 | 3.6 | M | 4 | C | Rm | *Canopy skewed to S over fence. Remove to favour adjacent trees. TPO* exempt when less than 10m in height.* |
| 91 | Chinese Hackberry, *Celtis sinensis* | 0.5 | 17 | N8, S9, E6, W6 | M | G | F | 2.5 | 6.0 | M | 3 | B | R+ | *Trunk lean to W. Possible that stem is emerging from same root system as T92. May need to be removed for substation. TPO* exempt when less than 10m in height.* |
| 92 | Chinese Hackberry, *Celtis sinensis* | 0.4, 0.3 | 16 | N8, S5, E11, W0 | M | G | F | 2.7 | 7.2 | S | 3 | C | R+ | *Canopy skewed to W. Inclusion in bark. Stem possibly emerging from the same root system as T91. May need to be removed for substation. TPO* exempt when less than 10m in height.* |
| 93 | Port Jackson Fig, *Ficus rubiginosa* | Multi | 10 | N7, S7, E4, W7 | M | G | F | 3.6 | 12.0 | M | 3 | B | R+ | *Growing out from existing wall. Canopy skewed to W. Raised timber deck proposed within SRZ.* |

| TREE No. | COMMON NAME/ GENUS SPECIES | DBH (m) | HEIGHT (m) | CANOPY RADIUS (m) | AGE CLASS | VIGOUR | CONDITION | SRZ RADIUS (m) | TPZ RADIUS (m) | SULE | ©SIG RATING | ©RETENTION INDEX | RECOMMENDATION | COMMENTS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 94 | African Olive, *Olea europaea subsp. Africana* | Multi | 5 | 4 | M | P | P | 2.3 | 4.8 | S | 4 | C | Rm | *TPO* exempt species. Chinese Hackberry seedlings 2 metres to S and 3 metres to SE. Proposed basement within SRZ.* |
| 95 | Chinese Hackberry, *Celtis sinensis* | 0.4 | 15 | 6 | M | G | F | 2.3 | 4.8 | L | 3 | B | Rm | *Twin stemmed from 3 metres; orientation N and S. Canopy contact with building. Located within proposed basement footprint. Remove and replant with evergreen species. TPO* exempt when less than 10m in height.* |
| 96 | Camphor Laurel, *Cinnamomum camphora* | 0.6 | 15 | 5 | N/A | N/A | N/A | 2.7 | 7.2 | N/A | 4 | D | Rm | *DEAD. Remove irrespective of development. Twelve metre tall Chinese Hackberry 2 metres to the N.* |
| 97 | African Olive, *Olea europaea subsp. Africana* | 0.3, 0.2 | 12 | N6, S1, E6, W1 | M | F | F | 2.3 | 4.8 | M | 4 | C | Rm | *TPO* exempt species. Canopy skewed to E. Proposed basement within SRZ.* |
| 98 | African Olive, *Olea europaea subsp. Africana* | 0.3, 0.2 | 10 | N5, S5, E1, W5 | M | F | F | 2.3 | 4.8 | M | 4 | C | Rm | *TPO* exempt species. Twin stemmed from base. Port Jackson Fig, with DBH of 0.2 metres, growing from base, extending to W. Located within proposed basement footprint.* |
| 99 | Chinese Hackberry, *Celtis sinensis* | 0.2, 0.2 | 9 | N2, S6, E6, W3 | M | G | F | 2.0 | 3.6 | M | 4 | C | Rm | *Twin stemmed from base, orientation E and W. TPO* exempt when less than 10m in height.* |
| 100 | Norfolk Island Pine, *Araucaria heterophylla* | 1.1 | 30 | 6 | M | G | G | 3.4 | 13.2 | L | 1 | A | R+ | *Heritage listed tree. Cavity on W side from 1-3 metres. Hollow trunk. Tallest tree within site. Proposed building within TPZ.* |
| 101 | Blackbean, *Castanospermum australe* | 0.3 | 12 | 5 | M | G | G | 2.0 | 3.6 | L | 3 | B | R | *Slight canopy skewed to W.* |
| 102 | Chinese Hackberry, *Celtis sinensis* | 0.3 | 15 | N10, S1, E1, W6 | M | G | F | 2.0 | 3.6 | M | 4 | C | Rm | *Canopy skewed to N. Within proposed building footprint. TPO* exempt when less than 10m in height.* |

| TREE No. | COMMON NAME/ GENUS SPECIES | DBH (m) | HEIGHT (m) | CANOPY RADIUS (m) | AGE CLASS | VIGOUR | CONDITION | SRZ RADIUS (m) | TPZ RADIUS (m) | SULE | ©SIG RATING | ©RETENTION INDEX | RECOMMENDATION | COMMENTS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 103 | African Olive, *Olea europaea subsp. Africana* | 0.3, 0.3 | 12 | N10, S2, E7, W5 | M | F | P | 2.5 | 6.0 | M | 4 | C | Rm | *TPO* exempt species. Twin stems from base. Lower northern stem in decline. Sparse foliage. Proposed building within TPZ. Remove and replant with evergreen tree.* |
| 104 | Cabbage Tree Palm, *Livistona australis* | 0.3 | 16 | 3 | M | G | G | 1.5 | 3.6 | M | 2 | A | R | *Transplantable. Conflicting with canopy of large Fig.* |
| 105 | Moreton Bay Fig, *Ficus macrophylla* | 2.5 | 22 | 15 | M | G | F | 7.5 | 15.0 | L | 1 | A | R+ | *Heritage listed tree. DBH of 2.5m measured at 3.0m above ground level. Extensive root buttressing. Hollowing/decayed centre. Multi stemmed from 8m. Large prop root 5m to NE. Entrance works within TPZ.* |
| 106 | Camphor Laurel, *Cinnamomum camphora* | 0.4 | 15 | N7, S3, E7, W4 | M | G | F | 2.3 | 4.8 | M | 4 | C | R | *Base sitting over rock floater. Suppressed to S by T105.* |
| 107 | Camphor Laurel, *Cinnamomum camphora* | 0.5 | 15 | N6, S3, E6, W6 | M | G | F | 2.5 | 6.0 | M | 3 | B | R | *Canopy pruned over road to W.* |
| 108 | Camphor Laurel, *Cinnamomum camphora* | 0.6, 0.3 | 15 | N8, S1, E4, W6 | M | G | F | 3.0 | 9.6 | M | 3 | B | R+ | *Trunk lean to N with 'dog leg' at 8 metres. Proposed building within TPZ.* |
| 109 | Chinese Hackberry, *Celtis sinensis* | 0.3, 0.1, 0.1 | 15 | N5, S5, E4, W3 | M | F | F | 2.0 | 4.8 | M | 4 | C | Rm | *Sparse foliage. Located within proposed building footprint.* |
| 110 | Cabbage Tree Palm, *Livistona australis* | 0.3 | 15 | 3 | M | G | G | 1.5 | 3.6 | L | 2 | A | T | *Slight trunk lean to E. Located within proposed building footprint. Transplant to appropriate location on site.* |

| TREE No. | COMMON NAME/ GENUS SPECIES | DBH (m) | HEIGHT (m) | CANOPY RADIUS (m) | AGE CLASS | VIGOUR | CONDITION | SRZ RADIUS (m) | TPZ RADIUS (m) | SULE | ©SIG RATING | ©RETENTION INDEX | RECOMMENDATION | COMMENTS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 111 | African Olive, *Olea europaea subsp. Africana* | Multi | 14 | N8, S3, E8, W6 | M | F | F | 2.7 | 7.2 | M | 3 | B | Rm | *TPO* exempt species. Canopy contact with roof. Located within proposed building footprint.* |
| 112 | Camphor Laurel, *Cinnamomum camphora* | 0.6 | 16 | N8, S1, E5, W3 | M | F | F | 2.7 | 7.2 | M | 3 | B | Rm | *Canopy skewed to N. Deadwood stubs at 4 and 8 metres. Located within proposed building footprint.* |
| 113 | Camphor Laurel, *Cinnamomum camphora* | 0.4 | 13 | N8, S1, E6, W5 | M | F | F | 2.3 | 4.8 | L | 3 | B | Rm | *Canopy skewed to N. Located within proposed building footprint.* |
| 114 | Camphor Laurel, *Cinnamomum camphora* | 1.1 | 20 | N12, S8, E8, W5 | M | G | F | 3.4 | 13.2 | L | 3 | B | Rm | *Twin stemmed from 2 metres, orientation N and S. Canopy contact with roof. Located within proposed building footprint.* |
| 115 | Tree of Heaven, *Ailanthus altissima* | 0.4 | 15 | N6, S6, E10, W1 | M | G | F | 2.3 | 4.8 | M | 4 | C | Rm | *TPO* exempt species. Trunk lean to NE. Extensive seed propagation throughout area. Located within proposed building footprint.* |
| 116 | Port Jackson Fig, *Ficus rubiginosa* | 0.8, 0.7, 0.6 | 15 | N8, S8, E8, W9 | M | F | P | 3.7 | 14.4 | R | 4 | D | Rm | *DBH taken at 1 metre above pavement level. Previously condemned due to hazard potential. Remove immediately. Major trunk failure to NE. Three stems from 1.5 metres. Roots and trunk lifting wall to W.* |
| 117 | Chinese Hackberry, *Celtis sinensis* | 0.3 | 14 | N5, S7, E4, W6 | M | F | F | 2.0 | 3.6 | L | 3 | B | R | *Canopy skewed to S. Consider removal and replacing with evergreen tree.* |

| TREE No. | COMMON NAME/ GENUS SPECIES | DBH (m) | HEIGHT (m) | CANOPY RADIUS (m) | AGE CLASS | VIGOUR | CONDITION | SRZ RADIUS (m) | TPZ RADIUS (m) | SULE | ©SIG RATING | ©RETENTION INDEX | RECOMMENDATION | COMMENTS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 118 | Moreton Bay Fig, *Ficus macrophylla* | 0.7 | 14 | N1, S8, E2, W2 | M | F | P | 2.8 | 8.4 | S | 4 | C | R+ | *Decay cavity at base on N side. Decayed buttress root to SE. Trunk lean to S with 'dog leg'. Nine metre tall African Olive 5 metres to the E. Proposed building within TPZ.* |
| 119 | Kauri Pine, *Agathis robusta* | 1.3 | 19 | N11, S11, E8, W8 | M | G | F | 5.5 | 15.0 | L | 1 | A | R+ | *Heritage listed tree. Top previously removed. Canopy overhanging existing building. Proposed building within TPZ. Care to be taken during demolition of existing building.* |
| 120 | Cocos Palm, *Syagrus romanzoffianum* | 0.3 | 12 | 4 | M | G | G | 1.5 | 2.4 | L | 4 | C | R+ | *TPO* exempt species. Proposed building within TPZ.* |
| 121 | Moreton Bay Fig, *Ficus macrophylla* | 0.3 | 9 | 3 | SM | G | F | 2.0 | 3.6 | L | 4 | C | R | *Slight canopy skewed to W.* |
| 122 | Moreton Bay Fig, *Ficus macrophylla* | 2.5 | 20 | N15, S10, E10, W15 | M | G | F | 7.5 | 15.0 | L | 1 | A | R | *Heritage listed tree. DBH measured at 3 metres above grade. Extensive root buttressing mainly to N, W and S. Canopy overhangs property and road to W. Three main stems. One stem extending to N low from ground level.* |
| 123 | Chinese Hackberry, *Celtis sinensis* | 0.2 | 8 | N2, S3, E1, W5 | SM | G | F | 1.7 | 2.4 | S | 4 | C | Rm | *Canopy skewed to W over road and fence. Remove and replant with suitable evergreen tree. TPO* exempt when less than 10m in height.* |
| 124 | Chinese Hackberry, *Celtis sinensis* | 0.2 | 7 | N3, S3, E1, W5 | SM | G | F | 1.7 | 2.4 | S | 4 | C | R | *Canopy skewed to W over road and fence. TPO* exempt when less than 10m in height. Remove and replace with suitable evergreen tree.* |
| 125 | Canary Island Date Palm, *Phoenix canariensis* | 0.7 | 6 | 6 | SM | G | G | 2.0 | 5.0 | L | 4 | C | R | |

| TREE No. | COMMON NAME/ GENUS SPECIES | DBH (m) | HEIGHT (m) | CANOPY RADIUS (m) | AGE CLASS | VIGOUR | CONDITION | SRZ RADIUS (m) | TPZ RADIUS (m) | SULE | ©SIG RATING | ©RETENTION INDEX | RECOMMENDATION | COMMENTS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 126 | Moreton Bay Fig, *Ficus macrophylla* | 1.1 | 19 | N10, S4, E8, W3 | M | G | F | 3.4 | 13.2 | M | 3 | B | R+ | *Basal cavity to N. Canopy skewed to NE. Proposed car park within TPZ.* |
| 127 | Port Jackson Fig, *Ficus rubiginosa* | 1.5 | 18 | N12, S8, E15, W5 | M | G | F | 3.9 | 15.0 | M | 2 | A | R+ | *Twin stemmed from 4 metres. Heavy canopy skewed to E. Proposed building and car park within TPZ.* |
| 128 | Bangalow Palm, *Archontophoenix cunninghamiana* | 0.3 | 10 | 3 | M | G | G | 1.5 | 3.6 | L | 3 | B | T | *Slight trunk lean to W. Transplant to suitable location on site.* |
| 129 | Bangalow Palm, *Archontophoenix cunninghamiana* | 0.3 | 10 | 3 | M | G | G | 1.5 | 3.6 | L | 3 | B | T | *Located within proposed ramp footprint. Transplant to suitable location on site.* |
| 130 | Sydney Red Gum, *Angophora costata* | 0.6 | 16 | N7, S8, E8, W5 | M | G | F | 2.7 | 7.2 | L | 2 | A | R+ | *Canopy skewed to SE over building. Proposed building within TPZ. Crown pruning required south side.* |
| 131 | African Olive, *Olea europaea subsp. Africana* | 0.3 | 12 | N6, S4, E6, W6 | M | F | F | 2.0 | 3.6 | M | 4 | C | Rm | *TPO* exempt species. Multi stemmed from 2 metres. Canopy skewed to W over road. Remove and replant with evergreen tree.* |
| 132 | Chinese Hackberry, *Celtis sinensis* | 0.4 | 15 | N10, S0, E4, W10 | M | G | F | 2.3 | 4.8 | S | 3 | C | Rm | *Trunk lean and canopy skewed to W. Canopy contact with existing building opposite. Remove and replant with suitable evergreen tree. TPO* exempt when less than 10m in height.* |
| 133 | Magenta Lillypilly, *Syzygium paniculatum* | 0.3 | 13 | N6, S1, E8, W3 | M | G | F | 2.0 | 3.6 | L | 3 | B | R | *Canopy skewed to E.* |

| TREE No. | COMMON NAME/ GENUS SPECIES | DBH (m) | HEIGHT (m) | CANOPY RADIUS (m) | AGE CLASS | VIGOUR | CONDITION | SRZ RADIUS (m) | TPZ RADIUS (m) | SULE | ©SIG RATING | ©RETENTION INDEX | RECOMMENDATION | COMMENTS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 134 | Illawarra Flame Tree, *Brachychiton acerifolius* | 0.3 | 12 | 3 | M | G | G | 1.5 | 3.6 | L | 3 | B | Rm | *Located within proposed car park footprint.* |
| 135 | Chinese Hackberry, *Celtis sinensis* | 0.4 | 12 | N 8, S3, E2, W10, | M | G | F | 2.3 | 4.8 | S | 3 | C | Rm | *Canopy skewed to W over road. Remove and replant with evergreen tree. TPO* exempt when less than 10m in height.* |
| 136 | Sydney Red Gum, *Angophora costata* | 0.3 | 10 | N4, S5, E5, W2, | M | F | F | 2.0 | 3.6 | M | 3 | B | R | *Canopy skewed to E. Sparse foliage.* |
| 137 | Forest Sheoak, *Allocasuarina torulosa* | 0.3 | 12 | 4 | M | G | G | 2.0 | 3.6 | L | 3 | B | R+ | *Proposed car park within TPZ.* |
| 138 | Chinese Hackberry, *Celtis sinensis* | 0.2 | 9 | N2, S2, E1, W4 | SM | F | F | 1.7 | 2.4 | M | 4 | C | Rm | *TPO* exempt species (as under 10 metres tall). Canopy skewed to NW over road. Remove and replant with evergreen tree.* |
| 139 | Turpentine, *Syncarpia glomulifera* | 0.2 | 8 | N2, S2, E4, W1 | SM | G | F | 1.7 | 2.4 | L | 4 | C | R | *Canopy skewed to E over bin store.* |
| 140 | Chinese Hackberry, *Celtis sinensis* | 0.2 | 8 | N4, S1, E4, W3 | SM | G | F | 1.7 | 2.4 | M | 4 | C | Rm | *TPO* exempt species (as under 10 metre tall). Canopy skewed to N. Proposed car park within TPZ. Remove and replant with evergreen tree.* |
| 141 | Swamp Sheoak, *Casuarina glauca* | 0.4 | 16 | 5 | M | G | G | 2.3 | 4.8 | L | 3 | B | R+ | *Twin stemmed from 6 metres. Located on neighbouring property. Proposed footpath within SRZ.* |

| TREE No. | COMMON NAME/ GENUS SPECIES | DBH (m) | HEIGHT (m) | CANOPY RADIUS (m) | AGE CLASS | VIGOUR | CONDITION | SRZ RADIUS (m) | TPZ RADIUS (m) | SULE | ©SIG RATING | ©RETENTION INDEX | RECOMMENDATION | COMMENTS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 142 | Tallowwood, *Eucalyptus microcorys* | 0.4, 0.4, 0.3 | 17 | N4, S4, E6, W6 | M | G | F | 3.0 | 7.2 | L | 3 | B | R | *Located on neighbouring property. Three stems from 6 metres of equal dominance. Deadwood in lower canopy.* |
| 143 | Tallowwood, *Eucalyptus microcorys* | 0.7 | 17 | N5, S3, E7, W7 | M | G | G | 3.5 | 8.4 | L | 2 | A | R | *Located on neighbouring property. Slight asymmetrical canopy weighted to E and W.* |
| 144 | Tallowwood, *Eucalyptus microcorys* | 0.8 | 17 | N8, S4, E8, W6 | M | G | F | 4.0 | 9.6 | L | 2 | A | R | *Located on neighbouring property. Pruned to N. Slight trunk lean to W.* |
| **144** | | | | | | | | | | | | | | |

| ©RETENTION INDEX | NO. OF TREES |
|---|---|
| **A** | 17 |
| **B** | 62 |
| **C** | 62 |
| **D** | 3 |

| RECOMMENDATION | NO. OF TREES |
|---|---|
| **R** | 20 |
| **R+** | 31 |
| **T** | 5 |
| **Rm** | 88 |

**COMMON NAME/GENUS SPECIES CULTIVAR -** Common names can vary with selected texts. Where species is unknown, "*sp*." indicated after genus. Where cultivar is unknown "*cv*" indicated after species. The number in brackets e.g. (x9) after the species indicates the number of trees in this tree group.

**DBH - Diameter at Breast Height.** Tree trunk diameter measured at breast height (1.4 metres above ground level). Fabric diameter tape is used which assumes a circular cross section. Multiple measurements indicate multiple trunks. More than three trunks are indicated as "multi". Where DBH measurement cannot be taken at 1.4m the height at which it has been taken is indicated in the Comments column.

**CANOPY RADIUS –** Average canopy radius (widest + narrowest ÷ 2). Circular canopy depictions on Tree Plan/Survey are indicative only. Where canopy spread was significantly skewed, all four cardinal point measurements were recorded.

**AGE CLASS** - **Immature (IM), Semi-mature (SM), Mature (M), Over-mature (OM).** Assessment of the tree's current Age. A **Mature (M)** tree has reached a near stable size (biomass) above and below ground. Trees can have a Mature age class for >90% of life span. **Over-mature (OM)** trees show symptoms of irreversible decline and decreasing biomass.

**VIGOUR - Good (G), Fair (F) or Poor (P).** The general appearance of the canopy/foliage of the tree at the time of inspection. Vigour can vary with the season and rainfall frequency. A tree can have Good vigour but be hazardous due to Poor condition. A tree in Good vigour has the ability to sustain its life processes. Vigour is synonymous with health.

**CONDITION** - **Good (G), Fair (F) or Poor (P).** The general form and structure of the trunk/s and branching. Trunk lean, trunk/branch structural defects, canopy skewness or other hazard features are considered.

**SRZ RADIUS - Structural Root Zone.** The area around a tree required for tree stability. Earthworks should be prohibited within the SRZ.. The area is calculated from the formula and graph at Figure 1 of AS4970-2009. The SRZ graph has been adapted from the work of Claus Mattheck (1994). DBH has been used instead of stem diameter above root buttress in the calculation of SRZ. 0.1m has been added to SRZ to allow for minor increases in stem diameter.

**TPZ RADIUS – Tree Protection Zone.** Radial offset (m) of twelve times (12X) trunk DBH measured from centre of trunk (for trees less than 0.3 metre DBH minimum TPZ is 2.0 metres). To satisfactorily retain the tree construction activity (both soil cut and fill) must be restricted within this offset. TPZ offsets are rounded to the nearest 0.1 metre. Existing constraints to root spread can vary TPZ. Generally an area equivalent to the TPZ should be available to the tree post development. Encroachment occupying up to 10% of the TPZ area is acceptable without detailed rootzone assessment. Encroachments greater than 10% require specific arboricultural assessment.

**SULE - Safe Useful Life Expectancy.** A systematic pre-development tree assessment procedure developed by Jeremy Barrell, Hampshire, England. The SULE method used in this assessment has been adapted for simplified use within the field. It gives a length of time that the Arborist feels a particular tree can be retained with an acceptable level of risk based on the information available at the time of the inspection. SULE ratings are **Long** (retainable for 40 years or more with an acceptable level of risk), **Medium** (retainable for 16-39 years), **Short** (retainable for 5-15 years) and **Removal** (tree requiring immediate removal due to imminent hazard or absolute unsuitability).

**©SIG. RATING - ©Significance Rating Scale (see Appendix C)**

**©RETENTION INDEX (see Appendix C)**

**RECOMMENDATIONS -** Retain ***(R)***, ***Retain Plus (R+)***, ***Transplant* (T)** or ***Remove (Rm)***.

**COMMENTS -** Comments relating to the location, surroundings and hazard potential of the trees at the time of inspection and where applicable the reason for removal. Trees identified as *TPO* exempt species* - Group A & B exempt tree species listed at Clause 6.1 of the Woollahra Tree Preservation Order do not apply on Heritage listed sites (i.e. all trees >5m in height on site are protected under the TPO).

# Attachment B: Site Photographs


**Photo A:** Tree 18, Port Jackson Fig showing location of the final pruning cut locations required for proposed construction. Approximately 20% of total leaf area to be removed. Minor canopy overhang of the northern-most portions of the building will be maintained. The pruning required on the large leaning stem will avoid the need to prop/brace this stem noting that a stem with similar lean fell in a NE direction approximately 5 years ago.

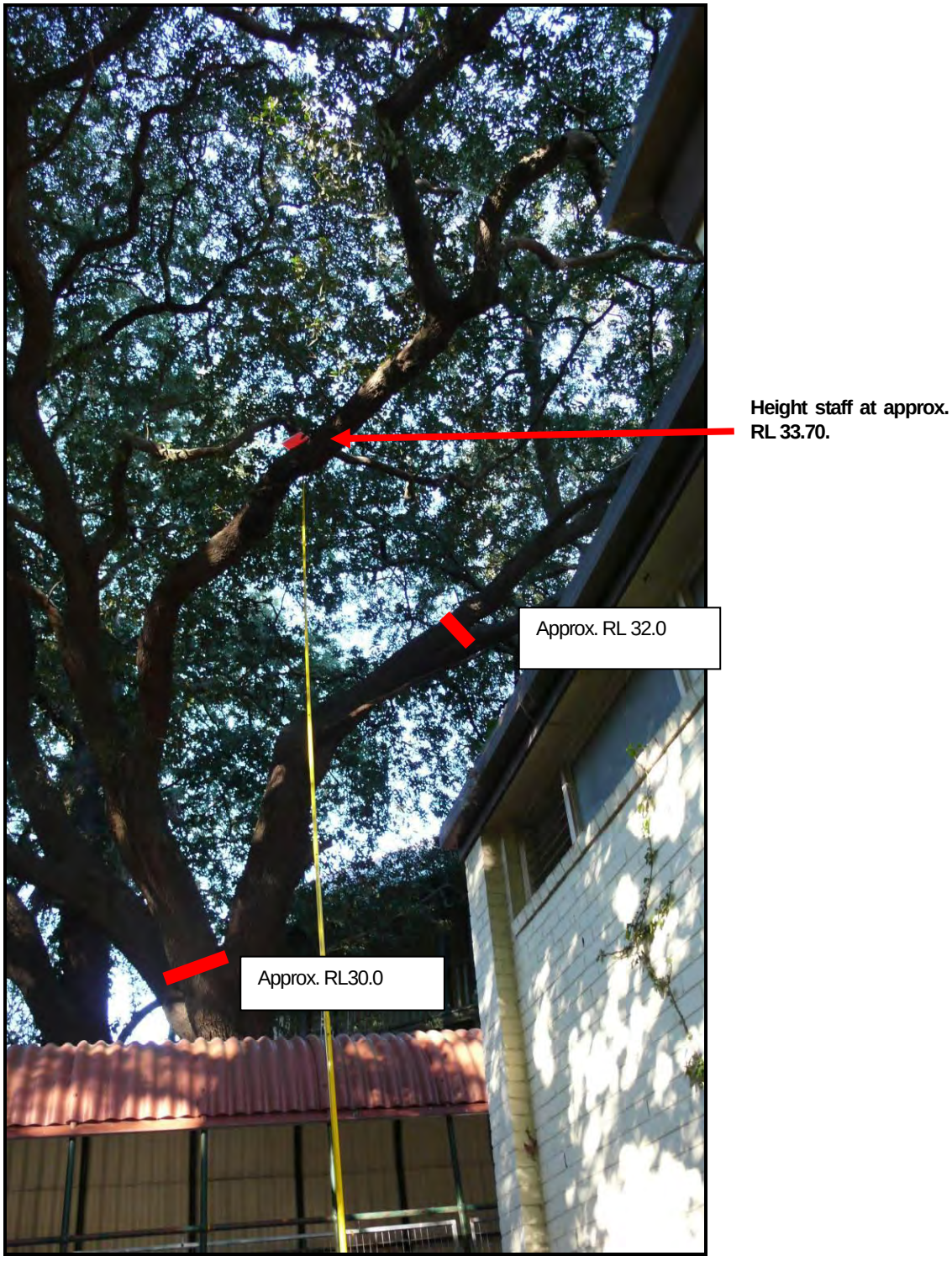


**Photo B:** Tree 81 Holm Oak showing final pruning cuts required to allow for construction. Approximately 20% of total leaf area to be removed.

# Attachment C: Definition of Terms

**COMMON NAME/GENUS SPECIES CULTIVAR –** Common names can vary with selected texts. Where species is unknown, "*sp*." indicated after genus. Where cultivar is unknown "*cv*" indicated after species. The number in brackets e.g. (x9) after the species indicates the number of trees in this tree group.

**DBH – Diameter at Breast Height.** Tree trunk diameter measured at breast height (1.4 metres above ground level). Fabric diameter tape is used which assumes a circular cross section. Multiple measurements indicate multiple trunks. More than three trunks are indicated as "multi". Where DBH measurement cannot be taken at 1.4m the height at which it has been taken is indicated in the Comments column.

**CANOPY SPREAD RADIUS –** Average canopy radius (widest + narrowest ÷ 2). Circular canopy depictions on Tree Plan/Survey are indicative only. Where canopy spread was significantly skewed, all four cardinal point measurements were recorded.

**AGE CLASS – Immature (IM), Semi-mature (SM), Mature (M), Over-mature (OM).** Assessment of the tree's current Age. A **Mature (M)** tree has reached a near stable size (biomass) above and below ground. Trees can have a Mature age class for >90% of life span. **Over-mature (OM)** trees show symptoms of irreversible decline and decreasing biomass.

**VIGOUR – Good (G), Fair (F) or Poor (P).** The general appearance of the canopy/foliage of the tree at the time of inspection. Vigour can vary with the season and rainfall frequency. A tree can have Good vigour but be hazardous due to Poor condition. A tree in Good vigour has the ability to sustain its life processes. Vigour is synonymous with health.

**CONDITION – Good (G), Fair (F) or Poor (P).** The general form and structure of the trunk/s and branching. Trunk lean, trunk/branch structural defects, canopy skewness or other hazard features are considered.

**SRZ RADIUS – Structural Root Zone.** The area around a tree required for tree stability. Earthworks should be prohibited within the SRZ.. The area is calculated from the formula and graph at Figure 1 of AS4970-2009. The SRZ graph has been adapted from the work of Claus Mattheck (1994). DBH has been used instead of stem diameter above root buttress in the calculation of SRZ. 0.1m has been added to SRZ to allow for minor increases in stem diameter.

**TPZ RADIUS – Tree Protection Zone.** Radial offset (m) of twelve times (12X) trunk DBH measured from centre of trunk (for trees less than 0.3 metre DBH minimum TPZ is 2.0 metres). To satisfactorily retain the tree construction activity (both soil cut and fill) must be restricted within this offset. TPZ offsets are rounded to the nearest 0.1 metre. Existing constraints to root spread can vary TPZ. Generally an area equivalent to the TPZ should be available to the tree post development. Encroachment occupying up to 10% of the TPZ area is acceptable without detailed rootzone assessment. Encroachments greater than 10% require specific arboricultural assessment.

**SULE – Safe Useful Life Expectancy.** A systematic pre-development tree assessment procedure developed by Jeremy Barrell, Hampshire, England. The SULE method used in this assessment has been adapted for simplified use within the field. It gives a length of time that the Arborist feels a particular tree can be retained with an acceptable level of risk based on the information available at the time of the inspection. SULE ratings are **Long** (retainable for 40 years or more with an acceptable level of risk), **Medium** (retainable for 16-39 years), **Short** (retainable for 5-15 years) and **Removal** (tree requiring immediate removal due to imminent hazard or absolute unsuitability).

**©SIG. RATING – ©Significance Rating Scale (see notes over)**

**©RETENTION INDEX (see notes over)**

**RECOMMENDATIONS –** Retain ***(R)***, ***Retain Plus (R+)***, ***Transplant*** **(T)** or ***Remove (Rm)***.

**COMMENTS –** Comments relating to the location, surroundings and hazard potential of the trees at the time of inspection and where applicable the reason for removal. Trees identified as *TPO* exempt species* - Group A & B exempt tree species listed at Clause 6.1 of the Woollahra Tree Preservation Order do not apply on Heritage listed sites (i.e. all trees >5m in height on site are protected under the TPO).

**©SIG. RATING – ©Significance Rating Scale.** A site specific qualitative evaluation of a tree relative to the existing landuse developed by Tree Wise Men® Australia Pty Ltd. Takes into consideration the impact of the tree on the surrounding landscape, streetscape and bushland. Rarity, habitat value, historical/cultural value and structural form of the tree are considered in this rating system. It is possible for a tree to have a Short SULE and a ©Significance Rating of 1. Likewise it is possible for a tree to be given a Long SULE and a ©Significance Rating of 4 (e.g. weed species). The ©Significance Ratings used in this Report are as outlined in Table 1.

**Table 2: ©Significance Rating Characteristics**

| Rating | Significance | Characteristics (some or all) |
|---|---|---|
| **©Sig. Rating 1** | **Exceptional** | ▪ Major contribution to site amenity<br>▪ Remnant specimen<br>▪ Heritage Listed<br>▪ Listed on Significant Tree Register<br>▪ Threatened Species<br>▪ Good vigour and condition<br>▪ Cultural significance<br>▪ Possible habitat for threatened fauna<br>▪ Excellent, well formed specimen<br>▪ Rare or unusual species<br>▪ Large above ground biomass<br>▪ Unique within the site and surrounds |
| **©Sig. Rating 2** | **High** | ▪ Considerable contribution to site amenity<br>▪ Remnant specimen<br>▪ Good vigour and condition<br>▪ Threatened Species<br>▪ Cultural significance<br>▪ Possible habitat tree for threatened fauna<br>▪ Well formed specimen<br>▪ Rare or unusual species<br>▪ Large or moderate above ground biomass<br>▪ Other specimens with similar characteristics within the site and surrounds |
| **©Sig. Rating 3** | **Moderate** | ▪ Minor contribution to site amenity<br>▪ Remnant or planted<br>▪ Fair or Poor vigour and condition<br>▪ Potential for growth<br>▪ Well formed or asymmetrical form<br>▪ Other specimens with similar characteristics within the site and surrounds |
| **©Sig. Rating 4** | **Low** | ▪ Small/poor specimen<br>▪ Poor vigour and condition<br>▪ Inappropriate for the location<br>▪ Minor contribution to landscape amenity<br>▪ Easily replaced<br>▪ Weed species or TPO Exempt<br>▪ Hazardous<br>▪ Previously ©Sig. Rating 5 tree |

**©RETENTION INDEX.** A site specific assessment of an individual tree's retention value developed by Tree Wise Men® Australia Pty Ltd. Incorporating SULE and ©Significance Rating each tree is allocated a retention value of A, B, C or D. The ©Retention Index values can be described as follows:

| | | |
|---|---|---|
| **©Retention Value A** | **Should be retained** | ▪ Major redesign may be required (e.g. movement of building footprint, re-alignment of roadway). |
| **©Retention Value B** | **Could be retained** | ▪ Minor redesign may be required (e.g. level changes, pavement detail). |
| **©Retention Value C** | **Could be removed** | ▪ Should not constrain proposed development. |
| **©Retention Value D** | **Should be removed or permanently fenced off (irrespective of development layout.)** | ▪ Imminently dangerous.<br>▪ In an irreversible state of decline. |

| **©Retention Index** | | **©Significance Rating** | | | |
|---|---|---|---|---|---|
| | | **1** | **2** | **3** | **4** |
| **SULE Rating** | **Long (40+ years)** | **A** | | **B** | **C** |
| | **Medium (15-40 years)** | | | | |
| | **Short (5-15 years)** | **B** | | | |
| | **Remove (< 5 years)** | **D** | | | |

# Attachment D: Tree Protection Requirements (Generic)


TREE WISE MEN®
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## TREE PROTECTION REQUIREMENTS (GENERIC)

The following generic tree protection requirements (TWMP1-TWMP12) should be implemented to minimise the impact of the proposed redevelopment on the retained trees. These requirements shall be implemented during the construction period in the event that no tree–specific requirements are detailed. Tree Protection Requirements should comply with Section 4 Tree Protection Measures of AS4970-2009.

**TWMP1 – Arborist Involvement.** An Arborist (the project arborist) experienced in tree protection on construction sites shall be engaged prior to the commencement of work on the site. The Arborist's tasks will be to monitor and report regularly to the PCA and the Applicant on the condition of the retained trees. The Project Arborist shall be present to supervise any excavation, trenching or tunnelling within the TPZ of any retained trees.

The schedule of works for the development shall acknowledge the role of the Project Arborist and the need to protect the retained trees. Sufficient notice shall be given to the Arborist where his/her attendance is required. Should the proposed design change from that reviewed, additional arboricultural assessment will be required.

**TWMP2 – Tree Pruning and Removal.** All tree pruning (including root pruning) and tree removal shall be carried out by a qualified and experienced Arborist to Australian Standard AS4373-2007, "Pruning of Amenity Trees" and the WorkCover Code of Practice for the Amenity Tree Industry, 1998.

Stump grinding (rather than complete "grubbing") of rootballs shall be performed when those stumps are within the TPZ of retained trees. This will minimise unnecessary root damage. Unnecessary damage often occurs to retained trees when undertaken by earthmoving machinery.

**TWMP3 – Mulching.** If construction is proposed within TPZ offsets mulching is required. Mulch to a depth of 100 millimetres using composted green waste mulch. The mulch should be free of weed seeds and other contaminants. Should constant access be required within the trees' TPZs, outside the protective fencing, heavier mulch should be spread to a depth no greater than 100 millimetres to reduce soil compaction.

**TWMP4 – Temporary Irrigation.** Where construction related activity or root cutting is proposed within the TPZ of retained trees, temporary irrigation or water cart access shall be provided to the remaining unimpacted TPZ areas to maintain adequate soil moisture levels. Delivery volumes are to allow for mulch layer and recent rainfall.

**TWMP5 – Tree Protection Fencing.** The retained trees shall be protected by means of fencing prior to commencement of demolition (including tree removal) or bulk earthworks.

It should be constructed from 1.8 metre high chain link wire or welded mesh suspended by galvanised steel pipe or equivalent and enclose the TPZ or the equivalent area allowing for building alignments.

The location of the fence should be determined at a site meeting between the Civil Contractor and the site Arborist to prevent the need to move the fencing during construction. The area enclosed shall be mulched (TWMP3) and irrigated (TWMP4) and kept free from all building materials, contaminants and other debris and shall not be used for storage of any building materials. If scaffolding is required within a tree protection zone the ground is to be mulched. (See Figure 3 AS4970, 2009)

**TWMP6 – Scaffolding.** If scaffolding or hoarding is required with TPZ, install as shown in Figure 5 AS4970, 2009).

**TWMP7 – Bulk Earthworks.** To prevent unnecessary root damage walk machinery within defined haul routes beyond TPZs wherever possible. The excavation shall be carried out under the supervision of the site Arborist. All roots within TPZ of retained trees are to be hand cut prior to machine cutting. Immediately following excavation the face of the cut within the TPZ shall be draped and maintained moist until backfilled. This should be done using a 10mm thick jute matting pinned at ground level and allowed to cover the full depth of the rootzone excavation.

There is to be no soil battering or unnecessary over excavation within TPZ offsets. Topsoil stripping should be restricted wherever possible within TPZ offsets by means of appropriate engineering solutions.

**TWMP8 – Prevention of Soil Compaction.** During the construction period there may be considerable traffic movement associated with general building activities. The resultant soil compaction and possible contamination of the soil can have an equally detrimental impact on the tree as does the severing and exposing of the roots during excavation.

Specific access tracks for machinery should be determined through consultation between the Civil Contractor and the Project Arborist. Should heavy vehicle movement be required within a retained tree's PRZ, a track should be formed at grade using large diameter (up to 100mm) recycled railway ballast (true basalt) over a geofabric or a corduroy of heavy timbers.

**TWMP9 – Trunk Protection.** Lengths of timber (75mm x 50mm x 2000mm) shall be used to protect a tree's trunk if construction or traffic is proposed within its SRZ and the tree cannot be fenced. The lengths of timber should be fastened around the trunk at 200 millimetre centres with hoop iron strapping or similar. (See Figure 4, AS4970, 2009).

**TWMP10 – Prevention of Soil Inversion.** Care shall be taken to avoid inversion of the soil layers on the site and particularly within TPZs, as clays placed over coarse textured soils will reduce water infiltration, creating a perched water table. Decline and/or death of underlying tree roots are expected due to moisture stress.

**TWMP11 – Services.** Trenching for services is to be regarded as "construction". Trenching within TPZ offsets should be avoided wherever possible to ensure <20% root loss (of TPZ) occurs on retained trees. Directional ("trenchless") boring or suspension of services should be used wherever possible. Where trenching is to occur within TPZ offsets, it is to be undertaken by hand to rock with no roots >50mm to be cut, under supervision of the Project Arborist.

**TWMP12 – Signs.** Signs as indicated below should be placed at regular intervals (min. 15 metres) on tree protection fencing. (See Figure C1 AS4970, 2009).

# Attachment E: Tree Protection Plan