

ABN 90887347745

Arboricultural Development Assessment Report

1-3 Thomas Street Lewisham NSW 2049 Lot 22 DP 827632

> FINAL April 2017 (Updated August 2017)





Member 2017



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Summary

This report has been compiled for the Sydney Catholic Schools. The report concerns a proposed Development Application for an extension to the existing Eileen OÇonnor Catholic College located at St Thomas Becket Catholic Church, 1-3 Thomas Street, Lewisham NSW 2049. This arborist report refers to thirty eight (38) trees. The tree numbering in this report is not consecutive as it is based on numbers that were allocated for the entire Eileen OÇonnor Catholic College site. Only some of these trees are within the proposed works area.

Following a review of the designs and addressing Councils comments the design now retains an additional four (4) trees, three (3) of which are large mature specimens.

This report contains the following information required in Inner West Council Development guidelines should this report be required for and Development Application at the site:-

- 1) All trees were assessed for Safe Useful Life Expectancy (SULE).
- 2) Genus and species of each tree.
- 3) Impact of the proposed development on each tree.
- 4) Impact of retaining tree on the proposed development.
- 5) The Tree Protection Zone (TPZ) for each tree to be retained.
- 6) Any branch or root pruning that may be required for trees.

Through early consultation with the design team and the architects the most prominent trees on site have been possible to retain. The proposed designs require the removal of trees numbered as 27, 28, 60-72 and 75. All other trees are possible to retain.

Plans and drawings associated with this project should be amended to incorporate the recommendations in this report such as no grade changes below Trees 32, 33, 73, 74 and Tree group 83.

Site specific tree protection has been detailed for this project.

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VERSION CONTROL

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1 INTRODUCTION

1.1 This report has been conducted to assess the health and condition of thirty eight (38) trees located at 1-3 Thomas Street, Lewisham NSW 2049 (Diagram 1). The proposed works include extension to the existing Eileen O'Connor Catholic College. The tree numbering in this report is not consecutive as it is based on numbers that were allocated for the entire Eileen OÇonnor Catholic College site. Only some of these trees are within the proposed works area. This report has been prepared for the Sydney Catholic Schools as required for a Development Application with Inner West Council at this site. The study area can be seen in Diagram 2 along with the area of the proposed works. The proposed works include renovations and additions along with new landscaping for the site.

The subject trees were assessed for their health and condition. Also, included in this report are tree protection measures that will help retain and ensure that the long term health of the trees to be retained are not adversely affected by any proposed development in the future.

As specified in the Inner West Council Development Application guidelines the following data was collected for each tree:

- 1) A site plan locating all trees over five (5) metres in height, including all street trees.
- All trees were assessed for Safe Useful Life Expectancy (SULE), health and amenity value.
- 3) Genus and species of each tree.
- 4) Impact of the proposed development on each tree.
- 5) The Tree Protection Zone (TPZ) for each tree to be retained.
- 6) Any branch or root pruning that may be required for trees.

Also, noted for the purpose of this report were:

- Health and Vigour; using foliage colour and size, extension growth, presence of deadwood, dieback and epicormic growth throughout the tree.
- Structural condition using visible evidence of bulges, cracks, leans and previous pruning.
- The suitability of the tree taking into consideration the proposed development.
- Age rating; Over-mature (>80% life expectancy), Mature (20-80% life expectancy), Young, Sapling (<20% life expectancy).
- **1.2 Documents and information provided:** For this Arborist Report I have been provided with the site survey and Plans of the proposed works. The survey showed the existing trees and buildings on the site. Plans by Quinn O'Hanlon issued on 23/8/2017 (see section 2.8 for list of plans provided).
- **1.3 Location:** The proposed development site is located at 1-3 Thomas Street, Lewisham NSW 2049, known as Lot 22 in DP 827632. The proposed development site from herein will be referred to as "the Site".



Diagram 1: Location of subject site, Thomas Street, Lewisham NSW 2049 (Red arrow) (whereis.com.au, 2017).



Diagram 2: Location of the proposed works area (Red). (Google Earth, 2017)



Diagram 3: Location of subject site in 1943 (RTA, From the Skies, 2006)

2 METHODOLOGY

- 2.1 To record the health and condition of the trees, a Visual Tree Assessment (VTA) was undertaken on the subject trees on 17 March 2017. This method of tree evaluation is adapted from Matheny and Clark, 1994 and is recognised by The International Society of Arboriculture. Individual tree assessments are listed in Appendix 2 of this report. All inspections were undertaken from the ground. No diagnostic devices were used on these trees.
- 2.2 This report is only concerned with trees on the site that come under the Inner West Council Development guidelines and the tree related issues are still based on the previous Marrickville Local Government Area, Council developed Section 2.20 of the Marrickville Development Control Plan 2011 (Tree Management).
- **2.3 Height:** The heights and distances within this report have been measured with a Bosch DLE 50 laser measure.
- **2.4** Tree Protection Zones (TPZ): The Tree Protection Zone (TPZ) is the principal means of protecting trees on development sites. The TPZ is a combination of the root area and crown area requiring protection. It is an area isolated from construction disturbance, so that the tree remains viable. TPZ's have been calculated for each tree to determine construction impacts. The TPZ calculation is based on the Australian Standard *Protection of trees on development sites*, AS 4970, 2009.
- 2.5 Structural Root Zone (SRZ): The SRZ is a specified distance measured from the trunk that is set aside for the protection of tree roots, both structural and fibrous. The woody root growth and soil cohesion in this area are necessary to hold the tree upright. The TPZ and SRZ are measured as a radial measurement from the trunk. No roots should be severed within this area. A detailed methodology on the TPZ and SRZ calculations can be found in Appendix 4.

- 2.6 SULE: The subject trees were assessed for a Safe Useful Life Expectancy (SULE). The SULE rating for each tree can be seen the Tree Assessment Schedule (Appendix 2). A detailed explanation of SULE can be found in Appendix 3.
- **2.7 Impact Assessment:** An impact assessment was conducted on the site trees. This was conducted by assessing the site survey and tree health and condition. The proposed use of the site along with current damage to the site buildings was assessed for the purposes of the report along with the following:
 - Reduced Level (R.L.) at base of tree.
 - Incursions into the Tree Protection Zone (TPZ).
 - Assessment of the likely impact of the works.
 - Life expectancy of the tree.
 - Visual amenity the tree provides.

2.8 Plans provided: include Site Plan by QQH marked job No. 1340 DA1100 issue 1 dated 23/08/17; and site plans by Quinn O'Hanlon Architects Pty Ltd as per Transmittal of Documents drawing register, Revised Pre-DA issue dated 12/04/17 were provided:

DRAWING REGISTER

| ID | Name |
|---------|-------------------------------------|
| SD0000 | COVER SHEET |
| SD1000 | SITE ANALYSIS |
| SD1100 | SITE PLAN |
| SD1300 | STREET ELEVATIONS |
| SD1350 | SITE SECTION 01 & 02 |
| SD2221 | BLOCK B & C - MEZZANINE & ROOF PLAN |
| SD2222 | BLOCK B & C - FIRST FLOOR PLAN |
| SD2223 | BLOCK C - AREA REQUIREMENTS |
| SD2300 | BLOCK B - ELEVATIONS |
| SD2301 | BLOCK B - SECTION |
| SD2302 | BLOCK C - ELEVATIONS AND SECTIONS |
| SD3220 | BLOCK E - GROUND FLOOR PLAN |
| SD3221 | BLOCK E - FIRST FLOOR PLAN |
| SD3222 | BLOCK E - ROOF PLAN |
| SD3300 | BLOCK E - ELEVATIONS |
| SD3301 | BLOCK E - SECTION |
| SD4220 | BLOCK J - FLOOR PLANS |
| SD4300 | BLOCK J - ELEVATIONS AND SECTIONS |
| SD5220 | BLUCK D - GRUUND FLUUR PLAN |
| SD5221 | BLUCK D - FIRST FLUUR PLAN |
| SD5222 | BLOCK D - RUOF PLAN |
| SD5300 | BLUCK D - ELEVATIONS |
| SD5301 | BLUCK D - SECTIONS |
| SD9900 | JUNE 21st |
| 509901 | DECEIVIBER 21St |
| 203305 | IVIAR/ DEP 2 ISt |
| 509950 | |
| 20992.1 | PERSPECTIVE 2 |

3 RELEVANT BACKGROUND INFORMATION

- **3.1** The site consists of a portion of the land owned by the Catholic Archdiocese of Sydney located between Thomas Street and Charles O'Neil Way, Lewisham. Tree species consist of both native and exotic species that have been planted at various times in the properties history and as such their size vary considerably. No formal planting plan appears to have been followed so there is a diverse range of species present. The proposed works consist of major alterations and additions to the site along with landscape works.
- **3.2** Environmental Significance: Although the site is now within the recently merged Council areas of the Inner West Council the tree related issues are still based on the previous Marrickville Local Government Area, Council developed Section 2.20 of the Marrickville Development Control Plan 2011 (Tree Management) incorporating Amendment No. 1, which protects trees both on private and public land requiring Council's approval to undertake works on or in the vicinity of a tree. A Tree Works Permit is required for works (other than exemptions outlined in 2.20.3) to

1. Any tree with a height equal to or greater than 5 metres above ground level; or that is under 5 metres in height and has a trunk diameter of more than 300mm at ground level; or a canopy spread equal to or greater than 3 metres;

2. Any palm tree with a clean stem length of 5 metres or more above ground level;

3. Any tree in bushland; or

4. Any tree located within a foreshore building line as marked on the Foreshore Building Line Map of MLEP 2011.

5. Any tree that is a locally endemic species and located within a habitat corridor as shown on the Biodiversity Map in Section 2.13 (Biodiversity) – Appendix 3 of the DCP. A list of native vegetation is provided in Section 2.18 (Landscaping and Open Spaces) of the DCP.

- **3.3 Illegal tree removal:** Damaging or removing trees can result in heavy fines. Local Government does have the authority to issue on the spot fines known as penalty infringement notices (PINS) starting from \$3000 or can elect to have a potential tree damaging incident addressed in the Local Court. Recent cases, for example, include two (2) mature trees removed for development (Sutherland Shire Council (SSC) v Palamara, 2008) costing \$4,500 in fines and \$5,000 in court costs. SSC v El-Hage, 2010 concerning illegal tree removal of a single tree costing \$31,500 in fines and \$5,000 in costs. Poisoning trees can also incur substantial fines (SSC v Hill) resulted in a single tree fine that totalled \$14,000 plus a \$10,000 bond for a replacement tree. All of the above cases resulted in a criminal conviction for the guilty parties.
- 3.4 The Site Trees: The site was inspected on 17 March 2017. Each tree has been given a unique number for this site and can be viewed on the Tree Location Plan (Appendix 1). This plan is based on the site survey provided by Quinn O'Hanlon. The tree numbering in this report is not consecutive as it is based on numbers that were allocated for the entire Eileen OÇonnor Catholic College site.

The site trees were all assessed as being in good health and condition. The main trunk, first and second order branches are free of any cracks, splits or fruiting bodies. Old pruning wounds are showing good occlusion, a sign that the trees are photosynthesizing effectively. New extension growth was noted with leaf colour showing good to fair vitality on most of the site trees. The site trees would be considered to have 95% live canopies. The basal areas and woody root zones were free of any ground heaving, or lifting.

As can be seen in Diagram 3 the site was generally devoid of trees in 1943. Although the image is of a poor quality it does appear that Tree group 83 were present at this time. The larger, more significant trees on site are Trees 32 (Plate 1) and 82 and Group 83 (Plate 8) and to a lesser extent Trees 73 and 74 (Plate 2).

Tree 32 is a large, grand specimen of Lemon-scented Gum Tree (*Corymbia citridora*) located between Buildings 4 and 5. This tree is in excellent health and condition and appears free of any cracks, splits or fruiting bodies. Due to the existing curtilage surrounding this tree, pruning has been minimal resulting in a broad spreading canopy. The base of the tree consists of a lawn area that has had minimal compaction over the years and, as such, has helped to provide one of the best specimen trees on site. Car parking is proposed below this tree that will be within the calculated TPZ.

Trees 59-68 are all small trees or large shrubs that are growing in raised garden beds. Most of these raised garden beds are damaged to some extent, therefore long term retention of these trees and shrubs is not a long-term option but they could be retained for the short term. Trees 69 and 70 are both Weeping bottle brush (*Callistemon viminalis*) in small brick raised planter beds (Plate 11). These trees are in a similar situation to Trees 59-68.

Trees 73 and 74 are mature Tallowwood trees (*Eucalyptus microcorys*) that are in good health and condition. These trees are growing in a playground area and should be regularly checked (annually) for deadwood due to the target area below them. Extensive landscape works are proposed below these trees (Plate 2).

The largest group of trees on site is a group of six (6) Camphor Laurel (*Cinnamomum camphora*) located south west of Building 3 numbered as Tree Group 83 (Plate 8). As previously mentioned, it appears these trees were at a mature height in 1943 so they are potentially over eighty years old. This group of trees has grown as one and will have grafted root zones providing much stability. This grouping of canopies has also grown close together and formed a large single dome of canopy, visually apparent from the streetscape (Plate 7). Extensive woody roots will be present as noted by the lifted paving, shown in Plate 6. Although not native, I would still consider this group of trees as the next most significant group, aside of Tree 32. It is possible Council would request the retention of this group of trees due to visual amenity it provides from the

streetscape and they can be seen from a wide area. In Asia, this species has been known to live for 300 years.

3.5 Impacts of the proposed works: Following a review of the designs and addressing Councils comments the design now retains an additional four (4) trees, three (3) of which are large mature specimens.

The proposed designs require the removal of Trees numbered as 27, 28, 60-72 and 75. Tree 31, a mature Frangipani will be relocated. Appendices 9 has a detailed transplant method statement for this process. Trees numbered as 27, 28, 60-72 would not be considered as high value trees as they are all located in restricted root zones being the planter beds and would be more considered large shrubs rather than tree specimens such as 73 and 74. It is not probable that Trees 27, 28, 60-72 will reach large mature proportions in their current situations.

Trees 27 and 28 are proposed to be removed so as to increase off street parking. Adjustment of levels to aid overland flow requires the removal of Trees 60-68 (Plate 11). Also trees 69 and 70 for accessibility connections and adjustment of levels for overland water flow adjacent to the old church (Plate 12). Trees 71 and 72 are required to be removed to allow for the development and access connection between the new blocks E and I.

Tree 75 is proposed to be removed to allow for the school extension. This tree is a mature Weeping fig (*Ficus benjamina*) and in most Council areas has been previously listed as an exempt species that is not highly valued. As seen in Plate 4 the building next to this tree has now been removed. This structure was within the SRZ area of this tree and it is likely woody roots were damaged during the demolition process. A low value tree for the site this tree is recommended for removal.

Extensive works will occur within the TPZ of Tree 32 and Tree group 83. Car parking is proposed below Trees 32 and 33. This will be possible, provided there is no reduction in existing levels and that a porous surface finish is used such as the pavers shown in Plate 10.

Tree 82, a London Plane Tree will now be retained. There is an incursion into the TPZ for this tree however extensive discussions on design to minimise this incursion have realised the final design that has been submitted. The greatest impediment to this area is the traffic constraints that cannot be altered. This species is a hardy species and I anticipate it will tolerate the incursion.

The same issue will also occur below Tree group 83. Currently, these trees have a mulched inner root zone that the plans show will become partially used for car parking. This car park design based on the engineering details provided will reduce impacts and provide the opportunity to avoid major woody roots of these trees. Plans show that below Tree Group 83 the surface area will be a suspended slab. The inner SRZ area of these trees will be retained as garden area. The Engineering details are as follows;

- 180mm Slab with SL102 top and bottom and a concrete grade of 32MPa supported on screw piles.
- Screw piles are to be placed in a grid of no greater than 3000mm in any direction, and placed to avoid large tree roots and in as coordinated/approved by the project arborist.
- Screw piles to have a helix of no greater than 300mm in diameter and a shaft of no greater than 100mm diameter and be installed to a depth of 2500mm.
- Driveway is to limited to Medium Rigid Vehicles with a maximum load of 8T

Trees 73 and 74 are mature Tallowwood trees (*Eucalyptus microcorys*). These trees following redesign have now been retained. The landscape plans show that existing levels can be maintained with a surface finish of artificial turf. No services or drainage lines are shown passing through the TPZ of these trees.

Table 1, below shows an assessment of the Urban forest canopy that will be lost in comparison to the increase that will be gained from the new landscape plan. With the most significant trees on site being retained, a calculated increase in projected canopy cover the School has clearly increased the urban forest canopy as shown in Diagram 3.

| | | | | Canopy Cover by area | | | | | |
|--------------------------------|-------------------------------|---------------------------|--|---|--------------------|------------------------------------|--------------------|--------------------|---------------------------------|
| Tree Reference | Tree | Pot Size Proposed(Min) | Quantity (Assuming Tree 73/74/ 82 remain) | Tree being planted | Spread (Radius) | Tree size at maturity (Area) | Tree being removed | Spread (Radius) | Current tree size (m2, Area) |
| T1 | Acmena smithii 'Hot Flush' | 25L | Approx. 25 | T1 x 25 | .5 | 25 | 27 | .5 | 1 |
| T2 | Banksia integrifolia | 45L | 4 | T2 x 4 | 2 | 52 | 28 | 1 | 3 |
| Т3 | Lagerstroemia indica | 45L | 3 | T3 x 3 | 3 | 84 | 60 | 1 | 3 |
| T4 | Magnolia grandiflora | 400L | 2 | T4 x 2 | 5 | 156 | 61 | 2 | 13 |
| T5 | Prunus sp. | 45L | 3 | T5 x 3 | 2 | 84 | 62 | 2 | 13 |
| T6 | Pyrus sp. | 45L | 3 | T6 x 3 | 4 | 150 | 63 | 4 | 50 |
| T7 | Tristaniopsis laurina | 100L | 5 | T7 x 5 | 3 | 140 | 64 | 2 | 13 |
| Relocated (e)Trees (T31) | Plumeria sp. | - | - | 2 | | 13 | 65 | 4 | 50 |
| | | | | | | | 66 | 2 | 13 |
| | | | | | | | 67 | 2 | 13 |
| | | | | | | | 68 | 2 | 13 |
| | | | | | | | 69 | 3 | 28 |
| | | | | | | | 70 | 4 | 50 |
| | | | | | | | 71 | 2.5 | 20 |
| | | | | | | | 72 | 2.5 | 20 |
| | | | | | | | 75 | 6 | 113 |
| Totals | | | | 19 + (T1 hedge not included as canopy cover) | 5 | Gain=704m2 | 16 | | Loss=416m2 |

Table 1: Urban canopy cover loss/gain based on semi mature tree size.

4 RECOMMENDATIONS

- **4.1** A Project Arborist should be appointed to oversee the Arboricultural related works for the project. The Project Arborist should be used for Arboricultural certification services and also used as a point of contact should any questions arise during the project. As specified in AS 4970, 2009, a Project Arborist is a person with a minimum Australian Qualification Framework (AQF) level 5 Diploma of Arboriculture or Horticulture qualification.
- **4.2** Through early consultation with the design team and the architects the most prominent trees on site have been possible to retain. The proposed designs require the removal of trees numbered as 27, 28, 60-72 and 75. All other trees are possible to retain.
- **4.3** Trees 32, 33 73, 74, 82 and Tree group 83 will require tree protection fencing as specified in Section 5.2 of this report. Indicative locations of the fencing can be seen in the Tree Protection Plan (Appendix 1). The specifications for a TPZ are in Section 5.5 of this report. As shown in the Tree Protection Plan the fencing will have to be moved for the two main periods of construction. This being the removal of the existing concrete where it will need to be placed close to the trunks. Once the concrete is removed the fencing shall be extended as far as possible to the drip line as shown in the Tree Protection Plan.
- **4.4 Trees 2- 12, 84 and 85** will require trunk protection as specified in Section 5.3 of this report. This trunk protection will be required due to the proximity of heavy equipment operating near these trees. It is important to protect the bark on trees. Bark is a very effective barrier that helps to protect trees from pest, disease and decay pathogens.
- **4.5** The root zones of **Trees 32, 33 73, 74 and Tree Group 83** will require protection from compaction. Compaction of the root zone reduces oxygen and moisture exchange of the roots. This will lead to premature death of the tree. To reduce compaction of the root zone mulch is recommended to be spread around the base of the tree to the extent of the TPZ fencing.

4.6 The area over the TPZ of Tree group 83 is proposed to be used for car parking and vehicle access. It is recommended that this area has a surface that is permeable to water and oxygen. The suspended slab system below Tree group 83 will be permeable to water and oxygen to a degree and the addition of a watering system will also help the trees with any anticipated change in hydrology.

The Australian Standard *Protection of trees on development sites*, (AS 4970) recommends no more than 10% encroachment unless the TPZ can be compensated elsewhere and contiguous with the TPZ. Although the works below Tree group 83 are within the TPZ area and cover a greater area than 10% the new designs show that the TPZ area would benefit from the concrete removal and addition of a porous surface as shown on the plans. Provided the porous paving can be installed at existing grades without disrupting structural woody roots this would allow the development to comply with AS4970.

4.7 The removal of the concrete below Tree group 83 and the existing artificial turf below Trees 73 and 74 shall be undertaken so as to pull the concrete away from the trees. A flat bucket excavator is recommended. A spotter shall be present to ensure overhanging branches are not damaged. These works below Tree group 83 should be supervised by the Project Arborist. Once the concrete is removed the project Arborist may recommend remedial actions such as drip irrigation or addition ground protection until the final surface finish can be completed.

5 TREE PROTECTION

- **5.1 Trees to be protected: Trees 32, 33 73, 74, 82 and Tree group 83** will be required to be fenced for protection prior to demolition works occurring. All fencing shall be installed as specified in Section 5.2 (Tree Protection Implementation of Tree Protection Zone). Indicative locations of the fencing are shown in the Tree Protection Plan (Appendix 1).
- **5.2** Implementation of Tree Protection Zone: All tree protection works should be carried out before the start of demolition or building work. It is recommended that chain mesh fencing with a minimum height of 1.8 metres be erected as shown in the Tree Protection Plan (Appendix 1). Specifications for this fencing are shown in Tree Protection Fencing Specifications (Appendix 5).
- **5.3** Individual trunk protection: Trees 2- 12, 84 and 85 will require trunk protection. This is achieved by attaching lengths of timber (75mm x 50mm x 2000mm) fastened around the trunk. Geotextile fabric or carpet underlay shall be wrapped around the trunk prior to the timbers being attached. These timbers are to be fastened with hoop iron strapping and not attached directly into the bark of the tree. These timbers are only to be removed when all construction is complete. Also see Section 5.4 of this report.
- **5.4 Instructional videos:** Alternatively you can view the Moore Trees short instructional films on the links below. These films are a quick onsite reference for builders, project managers and architects.

Film #1, Trunk Protection https://www.youtube.com/watch?v=ehcFre6bp74 Film #2, Tree Protection Fencing https://www.youtube.com/watch?v=ffMabxLN9nU Film #3, TPZ Ground Protection https://www.youtube.com/watch?v=Se-VILi-AGQ **5.5** The Tree Protection Zone (TPZ) and Structural Root Zone (SRZ): The TPZ is implemented to ensure the protection of the trunk and branches of the subject tree. The TPZ is based on the Diameter at Breast Height (DBH) of the tree. The SRZ is also a radial measurement from the trunk used to protect and restrict damage to the roots of the tree. TPZ and SRZ distances are listed in the Tree Schedule (Appendix 2).

The Tree Protection Zone (TPZ) and Structural Root Zone (SRZ) have been measured from the centre of the trunk. The following activities shall be avoided within the TPZ and SRZ of the trees to be retained;

•Erecting site sheds or portable toilets.

•Trenching, ripping or cultivation of soil (with the exception of approved foundations and underground services).

•Soil level changes or fill material (pier and beam or suspended slab construction are acceptable).

•Storage of building materials.

•Disposal of waste materials, solid or liquid.

- **5.6 Tree Damage:** If the retained trees are damaged a qualified Arborist should be contacted as soon as possible. The Arborist will recommend remedial action so as to reduce any long term adverse effect on the tree's health.
- **5.7 Signage:** It is recommended that signage is attached to the tree protection fencing. A sample sign has been attached in Appendix 6. This sign may be copied and laminated then attached to any TPZ fencing.
- **5.8 Root Pruning:** If excavations are required within a TPZ this excavation shall be done by hand to expose any roots. Any roots under fifty (50) millimetres in diameter may be pruned cleanly with a sharp saw. Tree root systems are essential for the health and stability of the tree. Severed roots shall be treated with Steriprune®, available at most large Hardware Stores.

- **5.9 Arborist Certification:** It is recommended that the developer to supply Council or the Principal Certifying Authority with certification three (3) times during the construction phase of the development in order to verify that retained trees have been correctly retained and protected as per the conditions of consent and Arborist's recommendations. The certification is to be conducted by a Qualified Consulting Arborist with AQF level 5 qualifications that has current membership with either Arboriculture Australia (AA) or Institute of Australian Consulting Arboriculturists (IACA). Arborist certification is recommended:
 - (1) Before the commencement of demolition or construction to confirm the application of mulch and fencing has been installed;
 - (2) At mid point of the construction phase;
 - (3) At completion of the construction phase.

If you have any questions in relation to this report please contact me.

Paul Vezgoff Consulting Arborist Dip Arb (Dist), Arb III, Hort cert, AA, ISA 22nd August 2017



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6 IMAGES



Plate 1: Image showing Trees 32 and 33 to be retained. P. Vezgoff.



Plate 2: Image showing Trees 73 and 74. P. Vezgoff.



Plate 3: Image showing Trees 78-81. P. Vezgoff.



Plate 4: Image showing Tree 75. P. Vezgoff.



Plate 5: Image showing Tree group 83. P. Vezgoff.



Plate 6: Image showing the condition of the concrete around Tree group 83. P. Vezgoff.



Plate 7: Image showing the dense canopies of Tree group 83 P. Vezgoff.



Plate 8: Image showing Tree group 83



Plate 9: Image showing street trees along Thomas Street. P. Vezgoff.



Plate 10: Image showing porous paving recommended below Tree 32. P. Vezgoff.



Plate 11: Image showing Trees 60-68 in a small brick raised planter bed. P. Vezgoff.



Plate 12: Image showing Trees 69 and 70 in small brick raised planter beds. P. Vezgoff.

Tree Protection Plan



<u>Tree health & condition</u> <u>assessment schedule</u>

| | | Height | Spread | | Live | | | | | | TPZ | SRZ |
|------|----------------------|--------|--------|----------|------|----------|------------------|-----------|--------|-------------------------|-----|-----|
| Tree | Exotic Species | (m) | (m) | DBH (mm) | % | Defects | SULE | Condition | Age | Comments | | |
| | | | | | | No | | | | | 3.5 | 2.3 |
| | | | | | | visual | 2a May only live | | | Disruption of footpath. | | |
| 1 | Melaleauca bracteata | 7 | 3.5 | 300 | 95 | defects | for 15-40 years | Good | Mature | Under power lines. | | |
| | | _ | | | | Included | 2a May only live | | | Disruption of footpath. | 6 | 2.7 |
| 2 | Melaleauca bracteata | 7 | 3.5 | 250x2 | 95 | bark | for 15-40 years | Good | Mature | Under power lines. | | |
| | | | | | | No | | | | | 3 | 1.5 |
| | | _ | | | | visual | 2a May only live | | | Disruption of footpath. | | |
| 3 | Melaleauca bracteata | 7 | 3.5 | 250 | 95 | defects | for 15-40 years | Good | Mature | Under power lines. | | |
| | | | | | | No | | | | | 3.5 | 2.3 |
| | | _ | 2.5 | 200 | 05 | visual | 2a May only live | | | Disruption of footpath. | | |
| 4 | Melaleauca bracteata | / | 3.5 | 280 | 95 | defects | for 15-40 years | Good | Mature | Under power lines. | | 4.5 |
| | | | | | | NO | | | | | 3 | 1.5 |
| _ | | 7 | 2.5 | 200 | 05 | visual | 2a May only live | Card | Matura | Disruption of footpath. | | |
| 5 | Melaleauca bracteata | / | 3.5 | 280 | 95 | defects | for 15-40 years | Good | Mature | Under power lines. | 2 | 4 5 |
| | | | | | | NO | 20 May only live | | | Discustion of featurath | 3 | 1.5 |
| c | Malalaayoo braataata | 7 | 2 5 | 200 | 05 | visual | for 15, 40 years | Cood | Matura | Disruption of footpath. | | |
| 0 | Weidleducd Dracleata | / | 3.5 | 280 | 95 | Ne | TOP 15-40 years | Good | wature | Under power lines. | 2 | 1 5 |
| | | | | | | NO | 22 May only live | | | Disruption of footpath | 5 | 1.5 |
| 7 | Melaleauca bracteata | 7 | 35 | 280 | 95 | defects | for 15-40 years | Good | Maturo | Under nower lines | | |
| | | / | 5.5 | 280 | | ucieus | 101 13-40 years | 0000 | Wature | Discuption of footnath | 25 | 23 |
| | | | | | | | | | | Under nower lines | 5.5 | 2.5 |
| | | | | | | No | | | | | | |
| | | | | | | visual | 2a May only live | | | | | |
| 8 | Melaleauca bracteata | 7 | 3.5 | 300 | 95 | defects | for 15-40 years | Good | Mature | | | |

TREE HEALTH AND CONDITION ASSESSMENT SCHEDULE - Thomas Street, Lewisham NSW 2049

Moore Trees Arborist Report, CEO, EOCC Lewisham 23/08/2017

| | | | | | Live | | | | | | TPZ | SRZ |
|------|------------------------|--------|--------|----------|--------|-------------------|------------------|-----------|--------|--------------------------|-----|-----|
| | | Height | Spread | | canopy | | | | | | | |
| Tree | Exotic Species | (m) | (m) | DBH (mm) | % | Defects | SULE | Condition | Age | Comments | | |
| | | | | | | No | | | | | 3.5 | 2.3 |
| | | _ | | | | visual | 2a May only live | | | Disruption of footpath. | | |
| 9 | Melaleauca bracteata | 7 | 3.5 | 300 | 95 | defects | for 15-40 years | Good | Mature | Under power lines. | | |
| | | | | | | No | | | | | 3.5 | 2.3 |
| | | _ | | | | visual | 2a May only live | | | Disruption of footpath. | | |
| 10 | Melaleauca bracteata | / | 3.5 | 300 | 95 | defects | for 15-40 years | Good | Mature | Under power lines. | 0.5 | |
| | | | | | | NO | | | | Discustion of featurable | 3.5 | 2.3 |
| 11 | Malalaayyaa kwaataata | 7 | 2.5 | 200 | 05 | visual | 2a May only live | Cood | Matura | Disruption of footpath. | | |
| 11 | Ivielaleauca bracteata | / | 3.5 | 300 | 95 | defects | for 15-40 years | Good | wature | Under power lines. | 2 5 | 2.2 |
| | | | | | | NO | | | | Discuption of footpath | 3.5 | 2.3 |
| 12 | Molaloauca bractoata | 7 | 2 5 | 200 | 05 | visual dofocto | for 15 40 years | Good | Maturo | Lindor nowor linos | | |
| 12 | Rhupherry Ash | / | 5.5 | 300 | 33 | No | 101 13-40 years | 0000 | wature | onder power intes. | | |
| | (Flaeocarpus | | | | | visual | | | | | | |
| 27 | reticulatus) | 4 | 0.5 | 60 | 100 | defects | 1a <40 years | Good | Mature | | | |
| / | Tuckeroo | • | 0.0 | | 100 | No | | 0000 | mature | | 1.5 | 1.5 |
| | (Cupaniopsis | | | | | visual | | | | | | |
| 28 | anacardiodes) | 4 | 1 | 100 | 100 | defects | 1a <40 years | Good | Mature | | | |
| | | | | | | No | | | | | 1.5 | 1.5 |
| | Frangipani (Plumeria | | | | | visual | | | | | | |
| 31 | sp) | 4 | 2 | 200 | 100 | defects | 5a | Good | Mature | | | |
| | | | | | | | | | | | 12 | 3.6 |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | Lemon-scented gum | | | | | No | | | | | | |
| | tree (Corymbia | | | | | visual | | | | | | |
| 32 | citriodora) | 23 | 10 | 970 | 100 | defects | 1a <40 years | Good | Mature | | | |

| | | | | | Live | | | | | | TPZ | SRZ |
|------|-------------------------|--------|--------|----------|--------|---------|------------------|-----------|--------|-----------------------|-----|-----|
| | | Height | Spread | | canopy | | | | | | | |
| Tree | Exotic Species | (m) | (m) | DBH (mm) | % | Defects | SULE | Condition | Age | Comments | | |
| | | | | | | No | | | | | 5 | 2.5 |
| | Weeping bottle brush | | | | | visual | | | | | | |
| 33 | (Callistemon viminalis) | 5 | 4 | 400 | 100 | defects | 1a <40 years | Good | Mature | Under canopy of 32 | | |
| | | | | | | No | | | | | 5 | 2.5 |
| | Black locust (Robinia | | | | | visual | 2a May only live | | | | | |
| 58 | pseudoacacia 'Frisia') | 9 | 5 | 400 | 100 | defects | for 15-40 years | Good | Mature | Surrounded by seating | | |
| | | | | | | No | | | | | 1.5 | 1.5 |
| | Willow Bottle brush | | | | | visual | | | | | | |
| 60 | (Callistemon salignus) | 6 | 1 | 100 | 70 | defects | 1a <40 years | Good | Mature | | | |
| | | | | | | No | | | | | 2 | 1.5 |
| | Willow Bottle brush | | | | | visual | | | | | | |
| 61 | (Callistemon salignus) | 6 | 2 | 100x2 | 70 | defects | 1a <40 years | Good | Mature | | | |
| | | | | | | No | | | | | 3.5 | 2.3 |
| | Willow Bottle brush | | | | | visual | | | | | | |
| 62 | (Callistemon salignus) | 7 | 2 | 100x3 | 70 | defects | 1a <40 years | Good | Mature | | | |
| | | | | | | No | | | | | 3 | 1.5 |
| | Weeping bottle brush | | | | | visual | 3a May only live | | | Extreme asymmetrical | | |
| 63 | (Callistemon viminalis) | 5 | 4 | 250 | 100 | defects | for 5-15 years. | Fair | Mature | lean | | |
| | | | | | | No | | | | | 2 | 1.5 |
| | Weeping bottle brush | | | | | visual | 2a May only live | | | | | |
| 64 | (Callistemon viminalis) | 7 | 2 | 180 | 100 | defects | for 15-40 years | Fair | Mature | | | |
| | | | | | | No | | | | | 2 | 1.5 |
| | Weeping bottle brush | | | | | visual | 3a May only live | | | Extreme asymmetrical | | |
| 65 | (Callistemon viminalis) | 5 | 4 | 200 | 100 | defects | for 5-15 years. | Fair | Mature | lean | | |
| | | | | | | No | | | | | 2 | 1.5 |
| | Swamp banksia | | | | | visual | | | | | | |
| 66 | (Banksia robur) | 9 | 2.5 | 200 | 100 | defects | 1a <40 years | Good | Mature | | | |

| | | | | | Live | | | | | | TPZ | SRZ |
|------|-------------------------|--------|--------|----------|--------|---------|------------------|-----------|--------|------------------------|-----|-----|
| | | Height | Spread | | canopy | | | | | | | |
| Tree | Exotic Species | (m) | (m) | DBH (mm) | % | Defects | SULE | Condition | Age | Comments | | |
| | | | | | | No | | | | | 2 | 1.5 |
| | | | | | | visual | | | | | | |
| 67 | Melaleuca decora | 5 | 2 | Multi | 95 | defects | 1a <40 years | Good | Mature | | | |
| | | | | | | | | | | | 2 | 1.5 |
| | | | | | | No | | | | | | |
| | | | | | | visual | | | | | | |
| 68 | Melaleuca decora | 5 | 2 | Multi | 95 | defects | 1a <40 years | Good | Mature | | | |
| | | | | | | No | | | | | 2 | 1.5 |
| | Weeping bottle brush | | | Multi | | visual | 3c Removed for a | | | Cracking brick planter | | |
| 69 | (Callistemon viminalis) | 7 | 4 | stemmed | 90 | defects | better specimen. | Poor | Mature | bed. | | |
| | | | | | | No | | | | | 2 | 1.5 |
| | Weeping bottle brush | | | Multi | | visual | 3c Removed for a | | | Cracking brick planter | | |
| 70 | (Callistemon viminalis) | 7 | 5 | stemmed | 90 | defects | better specimen. | Poor | Mature | bed. | | |
| | | | | | | No | | | | | 5.5 | 2.7 |
| | Willow Bottle brush | | | | | visual | 2a May only live | | | | | |
| 71 | (Callistemon salignus) | 7 | 2.5 | 150x3 | 100 | defects | for 15-40 years | Good | Mature | In brick planter bed. | | |
| | | | | | | No | | | | | 7 | 2.8 |
| | Willow Bottle brush | | | | | visual | 2a May only live | | | | | |
| 72 | (Callistemon salignus) | 7 | 2.5 | 150x4 | 100 | defects | for 15-40 years | Good | Mature | In brick planter bed. | | |
| | Tallowwood | | | | | No | | | | | 7 | 2.8 |
| | (Eucalyptus | | | | | visual | | | | Weight reduction of | | |
| 73 | microcorys) | 18 | 5 | 570 | 100 | defects | 1a <40 years | Good | Mature | southern lateral at 8m | | |
| | | | | | | | | | | | 7 | 2.8 |
| | Tallowwood | | | | | No | | | | | | |
| | (Eucalyptus | | | _ | | visual | | | | | | |
| 74 | microcorys) | 18 | 5 | 580 | 100 | defects | 1a <40 years | Good | Mature | | | |
| 75 | Hills Weeping Fig | 8 | 7 | 480 | 100 | No | 1a <40 years | Good | Mature | Large surface roots. | 6 | 2.7 |

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| | | | | | Live | | | | | | TPZ | SRZ |
|------|------------------------|--------|--------|----------|--------|---------|--------------|-----------|--------|------------------------|-----|-----|
| | | Height | Spread | | canopy | | | | | | | |
| Tree | Exotic Species | (m) | (m) | DBH (mm) | % | Defects | SULE | Condition | Age | Comments | | |
| | (Ficus microcarpa var. | | | | | visual | | | | | | |
| | 'Hillii') | | | | | defects | | | | | | |
| | | | | | | No | | | | | 5 | 2.5 |
| | Melaleuca (Melaleuca | | | | | visual | | | | | | |
| 76 | linariifolia) | 7 | 2.5 | 400 | 100 | defects | 1a <40 years | Good | Mature | In mulched garden bed. | | |
| | | | | | | No | | | | | 2 | 1.5 |
| | Melaleuca (Melaleuca | | | | | visual | | | | | | |
| 77 | linariifolia) | 7 | 2.5 | 200 | 100 | defects | 1a <40 years | Good | Mature | In mulched garden bed. | | |
| | | | | | | No | | | | | 5 | 2.5 |
| | Melaleuca (Melaleuca | | | | | visual | | | | | | |
| 78 | linariifolia) | 8 | 2.5 | 400 | 100 | defects | 1a <40 years | Good | Mature | In mulched garden bed. | | |
| | | | | | | No | | | | | 2 | 1.5 |
| | Melaleuca (Melaleuca | | | | | visual | | | | | | |
| 79 | linariifolia) | 4 | 2.5 | 200 | 100 | defects | 1a <40 years | Good | Mature | In mulched garden bed. | | |
| | | | | | | No | | | | | 2 | 1.5 |
| | Melaleuca (Melaleuca | | | | | visual | | | | | | |
| 80 | linariifolia) | 4 | 2.5 | 150 | 100 | defects | 1a <40 years | Good | Mature | In mulched garden bed. | | |
| | | | | | | No | | | | | 3.5 | 2.3 |
| | Melaleuca (Melaleuca | | | | | visual | | | | | | |
| 81 | linariifolia) | 7 | 2.5 | 280 | 100 | defects | 1a <40 years | Good | Mature | In mulched garden bed. | | |
| | | | | | | No | | | | | 8.5 | 3.2 |
| | London plane | | | | | visual | | | | | | |
| 82 | (Platanus x hybrida) | 18 | 6 | 700 | 100 | defects | 1a <40 years | Good | Mature | | | |
| | | | | | | | | | | Tpz of at least 11m | | |
| | Camphor laurel | | | | | No | | | | | | |
| | (Cinnamomum | | | | | visual | | | | | | |
| 83 | camphora) | 17 | 12 | 500x 6 | 90 | defects | 1a <40 years | Good | Mature | | | |

| | | | | | Live | | | | | | TPZ | SRZ |
|------|-------------------------|--------|--------|----------|--------|---------|------------------|-----------|--------|----------|-----|-----|
| | | Height | Spread | | canopy | | | | | | | |
| Tree | Exotic Species | (m) | (m) | DBH (mm) | % | Defects | SULE | Condition | Age | Comments | | |
| | | | | | | No | | | | | 2 | 1.5 |
| | Fan palm | | | | | visual | 2a May only live | | | | | |
| 84 | (Washingtonia filifera) | 18 | 2.5 | 350 | 100 | defects | for 15-40 years | Good | Mature | | | |
| | | | | | | No | | | | | 2 | 1.5 |
| | Fan palm | | | | | visual | 2a May only live | | | | | |
| 85 | (Washingtonia filifera) | 18 | 2.5 | 350 | 100 | defects | for 15-40 years | Good | Mature | | | |
| | | | | | | | | | | | 5 | 2.5 |
| | Camphor laurel | | | | | No | | | | | | |
| | (Cinnamomum | | | | | visual | 2a May only live | | | | | |
| 86 | camphora) | 17 | 6 | 480 | 80 | defects | for 15-40 years | Fair | Mature | | | |
| | Camphor laurel | | | | | No | | | | | 5 | 2.5 |
| | (Cinnamomum | | | | | visual | 2a May only live | | | | | |
| 87 | camphora) | 17 | 6 | 480 | 80 | defects | for 15-40 years | Fair | Mature | | | |

KEY

Tree No: Relates to the number allocated to each tree for the Tree Location Plan.

Height: Height of the tree to the nearest metre.

Spread: The average spread of the canopy measured from the trunk.

DBH: Diameter at breast height. An industry standard for measuring trees at 1.4 metres above ground level, this measurement is used to help calculate Tree Protection Zones.

Live Crown Ratio: Percentage of foliage cover for a particular species.

| Age Class: Young: | Recently planted tree |
|-------------------|---------------------------|
| Mature: | 20-90% of life expectancy |

Semi-mature:< 20% of life expectancy Over-mature:>90% of life expectancy

SULE: See SULE methodology in the Appendix 3

Tree Protection Zone (TPZ): The minimum area set aside for the protection of the trees trunk, canopy and root system throughout the construction process. Breaches of the TPZ will be specified in the recommendations section of the report.

Structural Root Zone (SRZ): The SRZ is a specified distance measured from the trunk that is set aside for the protection of the trees roots both structural and fibrous.

SULE categories (after Barrell, 2001)¹

| SULE | Description |
|--------|---|
| Long | Trees that appeared to be retainable at the time of assessment for more than 40 years with an acceptable level of risk. |
| 1a | Structurally sound trees located in positions that can accommodate for future growth |
| 1b | Trees that could be made suitable for retention in the long term by remedial tree care. |
| 1c | Trees of special significance that would warrant extraordinary efforts to secure their long term retention. |
| Medium | Trees that appeared to be retainable at the time of assessment for 15-40 years with an acceptable level of risk. |
| 2a | Trees that may only live for 15-40 years |
| 2b | Trees that could live for more than 40 years but may be removed for safety or nuisance reasons |
| 2c | Trees that could live for more than 40 years but may be removed to prevent interference with more suitable individuals |
| | or to provide for new planting. |
| 2d | Trees that could be made suitable for retention in the medium term by remedial tree care. |
| Short | Trees that appeared to be retainable at the time of assessment for 5-15 years with an acceptable level of risk. |
| 3a | Trees that may only live for another 5-15 years |
| 3b | Trees that could live for more than 15 years but may be removed for safety or nuisance reasons. |
| 3c | Trees that could live for more than 15 years but may be removed to prevent interference with more suitable individuals |
| | or to provide for a new planting. |
| 3d | Trees that require substantial remedial tree care and are only suitable for retention in the short term. |
| Remove | Trees that should be removed within the next five years. |
| 4a | Dead, dying, suppressed or declining trees. |
| 4b | Dangerous trees because of instability or loss of adjacent trees |
| 4c | Dangerous trees because of structural defects |
| 4d | Damaged trees not safe to retain. |
| 4e | Trees that could live for more than 5 years but may be removed to prevent interference with more suitable individuals |
| | or to provide for a new planting. |
| 4f | Trees that are damaging or may cause damage to existing structures within 5 years. |
| Small | Small or young trees that can be reliably moved or replaced. |
| 5a | Small trees less than 5m in height. |
| 5b | Young trees less than 15 years old but over 5m in height. |

1 (Barrell, J. (2001) "SULE: Its use and status into the new millennium" in *Management of mature trees*, Proceedings of the 4th NAAA Tree Management Seminar, NAAA, Sydney.

TPZ and SRZ methodology

Determining the Tree Protection Zone (TPZ)

The radium of the TPZ is calculated for each tree by multiplying its DBH x 12.

$$TPZ = DBH \times 12$$

Where

DBH = trunk diameter measured at 1.4 metres above ground

Radius is measured from the centre of the stem at ground level.

A TPZ should not be less than 2 metres no greater than 15 metres (except where crown protection is required.). Some instances may require variations to the TPZ.

The TPZ of palms, other monocots, cycads and tree ferns should not be less than 1 metre outside the crown projection.

Determining the Structural Root Zone (SRZ)

The SRZ is the area required for tree stability. A larger area is required to maintain a viable tree.

The SRZ only needs to be calculated when major encroachment into a TPZ is proposed.

There are many factors that affect the size of the SRZ (e.g. tree height, crown area, soil type, soil moisture). The SRZ may also be influenced by natural or built structures, such as rocks and footings. An indicative SRZ radius can be determined from the trunk diameter measured immediately above the root buttress using the following formula or Figure 1. Root investigation may provide more information on the extent of these roots.

SRZ radius = $(D \ge 50)^{0.42} \ge 0.64$

Where

D = trunk diameter, in m, measured above the root buttress

NOTE: The SRZ for trees with trunk diameters less than 0.15m will be 1.5m (see Figure 1).



The curve can be expressed by the following formula: R_{SRZ} = (D \times 50) $^{0.42}$ \times 0.64

FIGURE 1 - STRUCTURAL ROOT ZONE

Notes:

- 1 R_{sRZ} is the structural root zone radius.
- 2 D is the stem diameter measured immediately above root buttress.
- 3 The SRZ for trees less than 0.15 metres diameter is 1.5 metres.
- 4 The SRZ formula and graph do not apply to palms, other monocots, cycads and tree ferns.
- 5 This does not apply to trees with an asymmetrical root plate.

Tree protection fencing

specifications



LEGEND:

- 1 Chain wire mesh panels with shade cloth (if required) attached, held in place with concrete feet.
- 2 Alternative plywood or wooden paling fence panels. This fencing material also prevents building materials or soil entering the TPZ.
- 3 Mulch installation across surface of TPZ (at the discretion of the project arborist). No excavation, construction activity, grade changes, surface treatment or storage of materials of any kind is permitted within the TPZ.
- 4 Bracing is permissible within the TPZ. Installation of supports should avoid damaging roots.

Figure 1: Protective fencing as specified in AS 4970, 2009.

Tree protection sign

sign sample



Tree Protection Zone

Fence not to be moved without approval from Arborist

Within this fence there is to be

NO

Storage of materials Trenching or excavation Washing of tools or equipment Moore Trees Tree Consultancy 0411 712 887

Tree Trunk Protection

Protection not to be removed until all construction works completed.

> Around the base of this tree there is to be NO Storage of materials Trenching or excavation Washing of tools or equipment



Tree structure information diagram



Figure 2: Structure of a tree in a normal growing environment (AS 4970, 2009.).

Tree Transplant Specification

Tree Transplant Specification

This method statement will detail measures that should be implemented whilst moving and relocating Tree 31 (Frangipanni) and to help reduce any negative impacts on the subject tree due to the disturbance involved in relocation.

The method statement is detailed in four (4) separate sections, as listed below.

- 1) Excavation and lifting of the root ball.
- 2) Storage of the plant if immediate planting cannot occur
- 3) Planting of the plant
- 4) Aftercare.

It should be remembered that transplanting mature trees is a difficult process however if the following instructions are followed accordingly, the tree will have a good chance of survival and continue to grow.

Excavation of the root ball

A circular trench should be dug at a distance of approximately five hundred (500mm) millimetres from the trunk giving the overall root ball a one (1) metre spread. The trench should then angle towards the trunk with the aim of almost severing the entire root ball (Diagram 1). A hose set to high pressure can sometimes help expose the last roots at the base to allow them to be severed cleanly with a sharp pruning saw. Once the trench becomes deep enough steel poles (similar to scaffold poles) should be inserted so that the root ball does not collapse to one side. It is most likely the root ball will be a dense mat of root matter.

If the surrounding soil is very sandy it is likely that most of this soil will fall away during the lifting process. This is unavoidable during this process. What is important is to limit the damage to the root system.

If roots are required to be severed they should be cut cleanly with a sharp pruning saw. Try not to prune any roots over fifty (50) millimetres in diameter.

Lifting the root ball may take up to four (4) people using the leverage of the steel poles to lift the root ball to the required height (Diagram 1). An excavator can be used for this process taking care not to damage the trunks.



Diagram 1: Showing the excavated root ball with at least two (2) steel poles inserted to raise the root ball.

Note: If the exposed root ball is not replanted within the same day as being excavated, the entire root ball should be covered with wet hessian to retain moisture. Also see 5.2

Storage of the palms

Whilst lifted out of the hole, the root ball shall be wrapped in heavy grade cling film followed by black plastic. It is important to puncture holes in the bottom to allow the escape of water from rain and irrigation. Allow space that will leave a rim around the bag similar to a large pot. Fill this area with a loam soil mix that <u>does not</u> contain organic matter. This loam should be washed into the side of the bag as best as possible.

The finished level of loam should be the same as the level the palm was at in the ground. Mulch the top of the palms to cover all areas of exposed soil.

If using a sling attached to an excavator there should be no contact with the trunks. All slings shall be attached and wrapped around the root ball at any time the palms are required to be moved.

The plant shall be stored in a similar aspect to where it was growing. The less number of times the plant is moved reduces the chance of injury. The builder's advice and input may be required for this.

Irrigation attached to a timer shall be run in a continuous line over the palms. Drip irrigation will be the best form of regular irrigation. See below for watering quantities.

An Arborist shall be consulted if there is any visual evidence of yellowing of leaves, damage during the moving process or sudden change of vigour over the holding period.

Planting of the tree

Use a loam based soil mix for filling the new holes. Where sand or gravel has been placed in the bottom of planting holes, supposedly for the purpose of improving drainage of the soil above, this will in fact have just the opposite effect. This layer will unfortunately cause the soil above to become saturated when it otherwise would not.

Any roots matted at the bottom or circling around the root ball should be cut and removed or shortened and/or straightened. If these roots are not removed they will continue to grow in a circular restricted manner called 'Girdling'.

Don't backfill with compost. Compost is organic matter and without oxygen will begin to decompose below ground and eventually kill the palm.

Backfill with the soil you have dug from the hole if possible. If your site soil is unusable then back fill with a soil mix that is sand and loam based rather than using organic matter.

If you have planted the tree in a lawn area try to cultivate around the base so that the new roots will not compete with grass roots. Mulch the surface to retain moisture and encourage soil microbe activity.

Agricultural drainage pipe: To help make watering more effective when you plant the palm insert a length of Agricultural drainage pipe (100mm diameter). This will help water and also oxygen get to the base of the planting hole.

Aftercare

After being planted (carefully), the single most important need of a newly-planted tree is to receive adequate moisture. As a general rule one (1) bucket of water twice a week should suffice. Water must be concentrated on the existing root ball. An important point to remember is that moisture will not flow from wet surrounding soils back into the root ball. So, watering must concentrate on wetting the root ball itself. Below are some watering quantities specifically for Australian conditions.

| Container size | Tree height | Trunk Diameter | Litres | week |
|----------------|---------------|----------------|--------|------|
| 15-20 Ltrs | 1.5-2metres | 30mm | 5 | 1 |
| 40-50 Ltrs | 2.1-3.0metres | 50mm | 8 | 2 |
| 75-100 Ltrs | 3.1-4metres | 75mm | 12 | 3 |

I would estimate that the root ball for the subject trees will be around 100 +litres however the final volume of the root ball will need to be calculated.

A sturdy levy that will retain water must be built (and maintained) around the edge of the root ball of the tree. The pond created within the levy should be regularly filled with water.

If the watering basin remains wet between each watering then take a break from watering. It is good for the root ball to dry out between watering.

Do not stop watering in the event of rain. It might wet the ground but, unless heavy and/or prolonged, rain normally will not deliver adequate moisture to the root ball.

If the new growth on your tree is showing signs of wilting then water as soon as possible. If the new growth is wilting and the soil is waterlogged then the problem is below ground level.

As the specimens are mostly multi stemmed if a stem does appear to be dying off then consideration of the removal of this stem may need to occur in order to keep the other healthy stem(s) in good vigour.

Explanatory Notes

- Mathematical abbreviations: > = Greater than; < = Less than.
- Measurements/estimates: All dimensions are estimates unless otherwise indicated. Less reliable estimated dimensions are indicated with a '?'.
- **Species:** The species identification is based on visual observations and the common English name of what the tree appeared to be is listed first, with the botanical name after in brackets. In some instances, it may be difficult to quickly and accurately identify a particular tree without further detailed investigations. Where there is some doubt of the precise species of tree, it is indicated with a '?' after the name in order to avoid delay in the production of the report. The botanical name is followed by the abbreviation sp if only the genus is known. The species listed for groups and hedges represent the main component and there may be other minor species not listed.
- **Height:** Height is estimated to the nearest metre.
- **Spread:** The maximum crown spread is visually estimated to the nearest metre from the centre of the trunk to the tips of the live lateral branches.
- **Diameter:** These figures relate to 1.4m above ground level and are recorded in centimetres. If appropriate, diameter is measure with a diameter tape. 'M' indicates trees or shrubs with multiple stems.
- Estimated Age: Age is <u>estimated</u> from visual indicators and it should only be taken as a <u>provisional</u> <u>guide</u>. Age estimates often need to be modified based on further information such as historical records or local knowledge.
- **Distance to Structures:** This is estimated to the nearest metre and intended as an indication rather than a precise measurement.

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Curriculum Vitae

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EDUCATION and QUALIFICATIONS

- 2007 Diploma of Arboriculture (AQF Cert V) Ryde TAFE. (Distinction)
- 1997 Completed Certificate in Crane and Plant Electrical Safety
- 1996 Attained Tree Surgeon Certificate (AQF Cert II) at Ryde TAFE
- 1990 Completed two month intensive course on garden design at the Inchbald School of Design, London, United Kingdom
- 1990 Completed patio, window box and balcony garden design course at Brighton College of Technology, United Kingdom
- 1989 Awarded the Big Brother Movement Award for Horticulture (a grant by Lady Peggy Pagan to enable horticulture training in the United Kingdom)
- 1989 Attained Certificate of Horticulture (AQF Cert IV) at Wollongong TAFE

INDUSTRY EXPERIENCE

Moore Trees Arboricultural Services

Tree Consultancy and tree ultrasound. Tree hazard and risk assessment, Arborist development application reports Tree management plans.

Woollahra Municipal Council Oct 1995 to February 2008

ARBORICULTURE TECHNICAL OFFICER

August 2005 - February 2008

Tree asset management, programmed inspection, inventory and condition surveys of council trees, hazard and risk appraisal, Tree root damage investigation and reporting, assessment of impacts of capital works projects on council trees.

ACTING COORDINATOR OF TREES MAINTENANCE

June - July 2005, 2006

Responsible for all duties concerning park and street trees. Prioritising work duties, delegation of work and staff supervision. TEAM LEADER

January 2003 – June 2005 and September 2000 – January 2003

HORTICULTURALIST

October 1995 – September 2000

Northern Landscape Services July to Oct 1995

Tradesman for Landscape Construction business

Paul Vezgoff Garden Maintenance (London, UK) Sept 1991 to April 1995

CONFERENCES AND WORKSHOPS ATTENDED

- QTRA Conference, Sydney Australia (November 2016)
- TRAQ Conference, Auckland NZ (October 2013)
- Tree risk management: requirements for a defensible system by Dr David Londsdale (Brisbane 2008)
- Tree dynamics and wind forces by Ken James (Brisbane 2008)
- Wood decay and fungal strategies by Dr F.W.M.R. Schwarze (Brisbane 2008)
- Tree Disputes in the Land & Environment Court The Law Society (Sydney 2007)
- Barrell Tree Care Workshop- Trees on construction sites (Sydney 2005).
- Tree Logic Seminar- Urban tree risk management (Sydney 2005)
- Tree Pathology and Wood Decay Seminar presented by Dr F.W.M.R. Schwarze (Sydney 2004)
- Inaugural National Arborist Association of Australia (NAAA) tree management workshop- Assessing hazardous trees and their Safe Useful Life Expectancy (SULE) (Sydney 1997).

January 2006 to date