Client	UNSW c/o Capital Insight Pty Ltd
Location	Tyree Energy Technologies Building UNSW.
Document Type	Arboriculture Assessment for Project Application
Date/Time	26th November 2009

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1. Contents

2 Introduction

2.1 On the 23rd of November 2009 Mr Hanna representing Capital Insight Pty Ltd contacted The Ents Tree Consultancy in regards to obtaining a tree report for the trees located on the proposed Tyree Energy Technologies Building site at the UNSW Kensington Campus. The client stated that the trees have been nominated to be inspected in relation to a project application. Consultation with the client about the number and position of trees to be inspected in relation to the works occurred prior to a survey being completed.

2.2 The site inspection of the nominated trees occurred on the 26th November 2009. The client was not present for the site inspection but the client had previously issued a verbal brief providing background information in regards to the trees on site. The client also issued a site plan showing the position of the trees on the site and another plan showing the extent of the works. Capital Insight has requested additional information in regards to some of the significant trees crowns in relation to the building (Refer to Appendix 6 & 7).

2.3 The purpose of this report is to assess the proposed works as well as the health and suitability of the trees nominated at the time of the inspection. Tree Protection Guidelines will be discussed for all trees nominated to be retained. The information in this report will be based on the information presented by the client at the time of the inspection as well as the site inspection.

2.4 To achieve the objectives of the report, the trees will be assessed noting the species, size, general condition with any defects discussed. The trees characteristics and eventual size will be taken into consideration as will the trees position in relation to structures and hard scapes. Recommendations will be outlined in section 5 of the report. A detailed list of the trees surveyed will be provided in Appendix 3 of the report and a numerical system will be used to identify them for this report and future reference on this job site. A site plan will show the trees and their allocated numbers in Appendix 5. Some additional trees were added as they were not on the plan but in the proposed works area and covered by the Tree Preservation Order.

3 Methodology

3.1 The trees were assessed using the standard Visual Tree Assessment technique (VTA). The trees were assessed from the ground for the purpose of this report. VTA is an internationally recognised practice in the visual assessment of trees as formulated by Mattheck & Breloer (1994).

3.2 A Lufkin 6.5m diameter tape was used to obtain the Diameter at breast height (DBH) as recommended at 1.3 metres unless otherwise stated due to variations in the trees form.

3.3 The height of the trees was estimated and the spread of the trees canopy was paced out.

3.4 A Canon 350D Digital camera with a 20-40mm lens was used to take all photographs in this report. No image modification has been used in any of the images.

3.5 The SULE rating system has been used as a guide to assist in determining the Safe Useful Life Expectancy of the tree surveyed. Refer to Appendices 1.

4 Discussion

4.1 The trees nominated to be inspected are located on the proposed Tyree Energy Technologies Building site UNSW Kensington Campus. Some of the trees are significant in the immediate landscape and some are likely to be considered important in the local areas landscape in terms of amenity and function. Capital Insight Pty Ltd and the associated planners have taken this into consideration during planning and have retained all trees with a high retention priority as nominated in the Development Control Plan, associated with the UNSW Kensington 2020 Master plan.

4.2 The trees are located on an exposed site with some protection from surrounding structures and topography. The trees receive supplemented irrigation and depending on their position supplementary fertilizers. The trees all appeared to be in good condition and have been adequately maintained by the University staff over the course of their life.

4.3 Based on the information provided by the client, the existing tennis courts and grounds buildings are to be demolished and the new Tyree Energy Technologies Building will be built in its place. The proposed structure will require the removal of some of the trees to the south and the west of the site. The trees are young or semi mature and are not considered to be of a high priority in the councils DCP. Additional care has been taken to protect the trees forming part of the Main Walk avenues to the North of the site.

4.4 The development retains the majority of the trees on site and all of the high priority trees listed on the DCP. The majority of the trees on site will have little or no disturbance due to the proposed works. To review the requirements of the trees to be retained and the trees to be removed they will be discussed in groups below. It is envisaged that all of the trees proposed to be retained can be kept in good condition for the duration of the works using the Tree Protection Guidelines as set out in appendix 2. Additional instructions will be discussed below as required.

4.5 Trees to be Removed.

4.5.1 The trees that are proposed to be removed are located to the West and the South of the site. These are trees 10, 10a, 11, 13a to 20, 20b, 25, 25a & 26. The removal of all trees listed here is not significant due to their small size and the large number of trees nominated to be retained. Trees 16, 17 25 & 25a are to be removed as they are located within the building footprint. Tree 26 is semi mature and is located within the middle of an access drive, this tree requires removal. To the credit of the UNSW, it would be difficult to recommend replacement plantings as there appears to be little room to position new trees on the site.

4.6 Trees to be Retained.

4.6.1 **Main Walk (Inner Avenue trees 1-4),** these trees 1-4 are situated along a prominent walkway running East to West across the site. There are two avenues which are close to the works. The northern most avenue is of Poplars, a hardy species that has performed well of the site since the 1960s. Provided access is limited to the Southern portion of the site through gate 14 on Barker Street and there are no excavations for services within the trees Tree Protection Zones it is anticipated that these mature and significant trees (1-4) will experience little or no disturbance to their crowns or root zones. It is anticipated that there will be no pruning required for access or for building clearance. The lawn area under these trees should form a large trees protection zone.

4.6.2 To the west of tree 4 on the inner avenue of the main walk south to between tree 7 and tree 8 on the outer avenue there is a proposed pathway indicated. It is recommended that the pathway is constructed in a manner which does not disturb any area within the Critical Root Zones of these trees (Refer to Appendix 3). This may involve suspended slabs pier and beam footings to minimise disturbance to the trees biological roots and structural roots.

4.6.3 **Main (Walk Outer Avenue 5-8),** these trees 5-8 are situated to the south or outer avenue of the main walk closest to the proposed building works. These trees are hardy and have good health. Previous experience with these trees on site has shown them to be resilient in regards to construction impacts. Based on the preliminary plans provided by FJMT Architects the proposed building is 5m away from the trees centre at ground level. This is the outer edge of the steps which are to be modified to provide a sympathetic footing to minimise disturbance to the trees roots such as pier and beam footing or suspended slabs. No excavation for services structures or setbacks will be permitted in the areas closer to the trees.

4.6.4 The lower ground level or basement is set back approximately 7m from the trees centre. This allows for retention of a sufficient section of the trees root plate for structure and adequate biological root function to be retained so the trees will not be significantly impacted upon. Due to the resilience of the trees, their extensive root systems and the nature of the sandy soil it is envisaged that there will be no impact on the trees structural stability or biological function. It is anticipated that there will be structural roots above 50mm severed. Care will need to be taken to ensure that this is done correctly, further planning will be developed as the project progresses. Refer to the Tree Protection Guidelines Appendix 2.

4.6.4, **Main Walk Outer Avenue (5-8 crowns)** These trees have broad crowns and although the crowns have been raised significantly in the past they may require further lifting or branch shortening in some areas. Any branches pruned will be secondary and not of primary branching structure. The building has been designed to allow for the tree crown to remain relatively unchanged. The only conflict between the trees crowns and the proposed buildings will be to allow for the clearance of the pillars that support the lofty roof. It is not envisaged that any large primary branches will be severed and modification of hte secondary branches will be sufficient. The building wall is set back beyond the trees crowns with sufficient building clearance. Minor crown raising may be required for the areas above the proposed path.

4.6.5 **Tree 9** is a feature tree on the western most end of the main walk. The tree is informally mirrored on the Northern side of the walk and is a tree of high value. Based on the preliminary plans provided by FJMT there appears to be little or no disturbance planned to occur around this tree in relation to the proposed works.

4.6.6 **Trees 12 & 13,** these trees are located to the west of the proposed building structure in close proximity. The majority of the works are of low impact to the trees in terms of the crown and the root zone disturbances. The basement setback is sufficient to retain the trees and the walls and roof of the site have been designed to retain the trees. These trees may mature and attain a size that may impact on the proposed roof. Long term management via pruning may be required to retain these trees and the building.

4.6.7 **Trees 20a, 20c to 24a,** are a group of trees to the south of the site separated from the proposed works by an existing wall which will remain in place for the duration of the works. For trees 20a, 20c, 21, 23 and 24 and 24a there will be little to no measurable disturbance. Tree 22 is a large and mature tree. The tree will receive some disturbance to the North within its critical root zone. Due to the nature of the species, the existing wall and the fact that the soil is sandy with the cut planned on the trees compression side it is not anticipated that this will be a problem.

4.7 Tree Protection

4.7.1 All works completed on site around the trees nominated to be retained should be conducted in accordance with the Tree Protection Guidelines as outlined in Appendix 2. Alterations to the guidelines will be discussed below. The entire grassed area of the main walk should be fenced off as a Tree Protection Zone (TPZ) from the work site to the edge of the main walk. The existing wall to the south of the proposed works site between New College and the work zone will act as a Tree Protection fence. The bitumen shall remain to protect the roots.

4.7.2 Tree 4 & tree 7 will require special consideration to the west and tree 8 will also require additional care to the East to allow work within the TPZ. This will also be the case for trees 5-8 in regards to root or canopy pruning and trees. Only suitably qualified arborists may cut any roots located during root mapping. It is anticipated that the pruning of secondary branches for pole clearance will be required for trees 5-8, however no primary limbs will require removing. Detailed pruning specifications will be developed when the works are scheduled.

4.7.3 Trees 5-8 will require consideration to the south of the trees to allow for care of both their crowns and root zones during the construction works. Due to the proximity of the planned works sheet piling will need to be used so that there is no set back towards the trees. Sheet Piling or another technique will also be important for trees 21 & 22 on the Northern side to prevent any setbacks closer to the trees.

5 Recommendations

After reviewing the site plan and the information provided by the client it is my recommendation the proposed plan for the Tyree Energy Technologies Building at the UNSW Kensington Campus is allowed to proceed with the following actions carried out.

It is recommended that trees 10, 10a, 11, 13a to 20, 20b, 25, 25a & 26 are removed due to their position in relation to the works. It would be difficult to recommend replacing these trees as the UNSW has an excellent tree planting policy in place and there is little or no room on this site for more trees.

It is recommended that trees 1 – 9, 12, 13 and trees 20a to 24 are retained in good condition for the duration of the works using the tree Protection Guidelines as outlined in appendix 2.

It is recommended that the comprehensive Tree Protection Guidelines outlined in Appendix 2 are be used to govern all works on site. *Note: All tree works are to be conducted by suitably qualified persons and should comply with the Australian standard for the pruning of Amenity trees AS4373.*

Please do not hesitate to call 0422 265 128 if you have any questions regarding the contents of this report.

Regards

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Advanced Certificate in Urban Horticulture

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Disclaimer

All trees have been assessed based on the information and facts of the site and as presented by the client or relevant parties at the time of inspection. No responsibility can be taken for incorrect or misleading information provided by the client or other parties.

The nominated tree/s are assessed for biological requirements and hazard potential with reasonable care. The trees are assessed from the ground and by visual means only unless otherwise stated. All tree protection and tree preservation measures are designed to minimise the damage to the tree/s or to reduce the hazard potential of the tree/s. Trees are inherently dangerous, therefore will always have a hazard potential.

Trees fail in ways that are not predictable or fully understood. There is no guarantee expressed or implied that failure or deficiencies may not arise of the subject trees in the future. No responsibility is accepted for damage to property or injury/death caused by the nominated tree/s.

Appendix 1
S.U.L.E Categories (After Barrell) 1996 Updated 01/04/01.

1. **Long S.U.L.E-** the tree appeared retainable at the time of assessment for over 40 years with an acceptable degree of risk, assuming reasonable maintenance:
    - **a.** Structurally sound trees located in positions that can accommodate future growth.
    - **b.** Trees, which could be made suitable for long term retention by remedial care.
    - **c.** Trees of special significance which would warrant extraordinary efforts to secure their long term retention.

2. **Medium S.U.L.E-** the tree appeared to be retainable at the time of assessment for 15 to 40 years with an acceptable degree of risk, assuming reasonable maintenance:
    - **a.** Trees, which may only live from 15-40 years.
    - **b.** Trees that may live for more than 40 years but may be removed for safety or nuisance reasons.
    - **c.** Trees which may live for more than 40 years but would be removed to prevent interference with more suitable individuals or to provide space for new plantings.
    - **d.** Trees which could be made suitable for retention in the medium term with remedial care.

3. **Short S.U.L.E-** trees that appeared to be retainable at the time of assessment for 5-15 years with an acceptable degree of risk, assuming reasonable maintenance:
    - **a.** Trees which may only live from 5 to 15 years.
    - **b.** Trees that may live for more than 15 years but may be removed for safety or nuisance reasons.
    - **c.** Trees which may live for more than 15 years but would be removed to prevent interference with more suitable individuals or to provide space for new plantings.
    - **d.** Trees which require substantial remediation and are only suitable for retention in the short term.

4. **Removal-** Tree which should be removed within the next 5 years.
    - **a.** Dead, dying suppressed or declining trees
    - **b.** Dangerous trees through instability or recent loss of adjacent trees.
    - **c.** Dangerous trees because of structural defects including cavities, decay included bark, wounds or poor form.
    - **d.** Damaged trees that are clearly not safe to retain.
    - **e.** Trees which may live for more than 5 years but would be removed to prevent interference with more suitable individuals or to provide space for new plantings.
    - **f.** Trees which are damaging or may cause damage to existing structures within the next 5 years.
    - **g.** Trees that will become dangerous after the removal of other trees for the reasons given in (A) to (F).
    - **h.** Trees in categories (A) to (G) that have a high wild life habitat value and with appropriate treatment could be retained subject to regular review.

5. **Small, young or regularly pruned-** Trees that can be reliably moved or replaced.
    - **a.** Small trees less than 5m in height.
    - **b.** Young trees less than 15 years old but over 5m in height.
    - **c.** Formal hedges and trees intended for regular pruning to artificially control growth.

Appendix 2
The Ents Tree Consultancy Tree Protection Guidelines

Definitions

a. **Tree Protection Zone (TPZ),** The TPZ is divided into 2 areas. 1 The Critical Root Zone delineated by an area five times the diameter of the tree trunk is assumed to contain most structural roots or The optimal root zone that is ten times the diameter of the tree trunk which is used to gauge the amount of feeder roots. No machinery works are permitted in these areas unless specified in this report or without written approval from the Council or the Arborist employed for this job site.

b. **Qualified Arborist,** for supervision of works and reports level 5. For carrying out tree works level 3 Levels are as recognised by the Australian training framework.

Standards AS 4373: 1996 The pruning of amenity trees.
Tree Protection Generally

i. Prior to works commencing erect a 900mm fence to protect the trees trunk at 10x Dbh or as specified in this report. The Tree Protection Zones as nominated should be marked with line marking paint and observed as an area free from machinery for the duration of the works unless stated other wise in the accompanying report. Do not remove, alter or relocate without the approval of the Council or the Arborist employed for this site.

ii. Trees to be protected in the works contract are items entrusted to the Contractor /owner by the Council for the purpose of carrying out the work under the Contract. The Contractor/owner has obligations to protect these trees as part of the care of the work in the contract conditions.

iii. Prior to commencing work on Site confirm with the Council all trees to be protected for the duration of the Works. Confirm also all access and haulage routes, storage areas, tree protection measures and work procedures. Ensure that the protection measures are in place prior to commencing work.

iv. Use suitably qualified Arborist (level 5) to supervise earthworks or activities within the Critical Root Zone of tree, Do not severe roots 75mm or greater, which may cause damage to or affect the health of trees. Pruning of trees by the contractor is not permitted. If pruning works are required a suitably qualified (Minimum level 3) arborist will complete all works.

v. Ensure construction trailers, vehicles and equipment do not come in contact with any tree at any time. Do not locate storage areas against trees. Do not deposit or store materials, spoil, contaminants, and waste or washout water within Tree Protection Zone.

vi. Take all reasonable precautions to protect trees to be retained on site from damage and decline, maintaining their health during the Contract. Implement standard horticultural requirements for tree care.

vii. Assess and monitor water stress in relation to trees on site. This is of particular importance if earthworks have occurred. Apply sufficient water to the trees on site as required to keep the trees healthy. Immediately report to the Council, any trees on site that are injured, damaged or are in decline.

NOTE: Failure to comply with any part of these tree protection guidelines will result in the party breaching the Tree Protection Guidelines taking responsibility for all associated consequences

Appendix 3 Assessment of Trees

Tree No	Species	Height (m)	Trunk Diameter (DBH*)	Canopy Spread (m)	Estimated Age Class	TPZ **	SULE ***	Observations and comments
1	*Populus deltoides*	18	.72	NS13 EW13.5	Mature	7m CRZ 3.5m	Medium	This mature tree has average health and average form for the species. The tree has a wound on the SE side of the trunk, previous testing revealed no significant decay is evident. There are no significant defects evident.
2	*Populus deltoides*	18	.73	NS14 EW10	Mature	7.5m CRZ 3.75m	Medium	This mature tree has average health and average form for the species. There is an average amount of deadwood and epicormic growth. Some branches suppress tree 5The tree has some wounded surface roots present and no significant defects evident.
3	*Populus deltoides*	18	.55	NS14 EW9	Mature	5.5m CRZ 2.75m	Medium	This mature tree has average health and average form for the species. There is an average amount of deadwood and epicormic growth. Some branches suppress tree 6. The tree has no significant defects evident.
4	*Populus deltoides*	18	.62	NS15 EW10	Mature	6m CRZ 3m	Medium	This mature tree has average health and average form for the species. There is an average amount of deadwood and epicormic growth. Some branches suppress tree 7 the tree has no significant defects evident.
5	*Ficus microcarpa 'hillii'*	16	1.05	NS 17 EW 15	Mature	10m CRZ 5m	Long	This mature tree has average health and average form for the species. The tree has 3 trunks from .6m and minor inclusions. The tree has been crown raised to the south and has some surface roots present. The tree has pruning wounds but no significant defects evident.
6	*Ficus microcarpa 'hillii'*	16	.96	NS 16 EW 18	Mature	10m CRZ 5m	Long	This mature tree has average health and average form for the species. The tree has 2 trunks from .6m and minor inclusions. The tree has been crown raised to the south and has some surface roots present. The tree has pruning wounds but no significant defects evident.
7	*Ficus microcarpa 'hillii'*	16	.88	NS 16 EW 15	Mature	9m CRZ 4. 5m	Long	This mature tree has average health and below average form for the species. The tree has 3 trunks from .6m, minor inclusions and the primary branches are crossing. The tree has been crown raised to the south and has some surface roots present, some to the south lifting tennis court. The tree has pruning wounds but no significant defects evident.
8	*Ficus microcarpa 'hilii'*	16	.93	NS 16 EW 15	Mature	9.5m CRZ 4.75m	Long	This mature tree has average health and average form for the species. The tree has 5 trunks from .7m and minor inclusions. The tree has been crown raised to the south and has some surface roots present. The tree has pruning wounds but no significant defects evident. Some roots lifting tennis courts.

Tree No	Species	Height (m)	Trunk Diameter (DBH*)	Canopy Spread (m)	Estimated Age Class	TPZ **	SULE ***	Observations and comments
9	*Ficus rubigonosa*	16	1.2	NS17 EW16	Mature	12m CRZ 6	Long	This mature tree has average health and below average form for the species. The tree has minor inclusions and branches into 4 trunks. The tree has numerous crossing branches but no significant defects evident. This tree has a low crown.
10	*Eucalyptus microcorys*	17	.30	NS7 EW5	Semi mature	3m CRZ 1.5m	Medium	This semi mature tree has average health and average form for the species. The tree has no significant defects present.
10a	*Eucalyptus microcorys*	14	.19	NS6 EW4	Semi mature	2m CRZ 1m	Medium	This semi mature tree has average health and below average form for the species. The tree has no significant defects present.
11	*Eucalyptus microcorys*	16	.41	NS5 EW4	Semi mature	4m CRZ 2m	Medium	This semi mature tree has average health and average form for the species. The tree has no significant defects present.
12	*Eucalyptus saligna*	16	.42	NS10 EW 7	Semi mature	4m CRZ 2	Medium	This semi mature tree has average health and average form for the species. The tree has no significant defects evident.
13	*Eucalyptus saligna*	15	.43	NS11 EW14	Semi mature	4.5m CRZ 2.25m	Medium	This semi mature tree has average health and average form for the species. The tree has no significant defects evident.
13a	*Lophostemon confertus*	5	.08	3	Young	1m CRZ 1m	Medium	This semi mature tree has average health and average form for the species. The tree has no significant defects evident.
14	*Lophostemon confertus*	7	.15	NS 3 EW 3	Semi mature	1.5m CRZ 1m	Medium	This semi mature tree has average health and average form for the species. The tree has no significant defects evident.
15	*Lophostemon confertus*	6	.14	4	Semi mature	1.5m CRZ 1m	Medium	This semi mature tree is has average health and average form for the species. The tree has a wound at the base but no significant defects evident.
16	*Eucalyptus punctata*	13	.19	4	Semi mature	2m CRZ 1m	Medium	This semi mature tree has average health and average form for the species. The tree has no significant defects evident.
17	*Eucalyptus punctata*	13	.18	4	Semi mature	2m CRZ 1m	Medium	This semi mature tree has average health and average form for the species. The tree has no significant defects evident.
18	*N/A*							This tree has been removed.
19	*Lophostemon confertus*	7	.21	5	Semi mature	2m CRZ 1m	Medium	This semi mature tree has average health and average form for the species. The tree has no significant defects evident.

Appendix 3 Assessment of Trees, (continued)

Tree No	Species	Height (m)	Trunk Diameter (DBH*)	Canopy Spread (m)	Estimated Age Class	TPZ **	SULE ***	Observations and comments
20	*Cupaniopsis anacardioides*	2	.04	1	Young	N/A	Medium	This tree is young with below average health and form. This tree is not covered by the tree preservation order.
20a	*Callitris cupressiformis*	16	.40	NS3 EW 5	Mature	4m CRZ 2m	Medium	This group of mature trees form a large informal hedge along the property boundary, The trees have average health and average form for the species. The trees have no significant defects evident.
20b	*Morus alba*	6	15	NS 5 EW 8	Semi mature	1.5m CRZ 1m	Remove	This semi mature tree is self sown and is a weed species.
20c	*Jacaranda mimosifolia*	17	.41	NS 6	EW 8	4m CRZ 2m	Medium	This semi mature tree appears to have been self sown. The tree is partially suppressed but has average health. The tree has no significant defects evident.
21	*Eucalyptus sideroxylon*	16	.54	Ns 8 EW 10	Mature	5.5m CRZ 2.75m	Medium	This semi mature tree is partially suppressed by tree 22, the tree has average health and below average form for the species. The tree has no significant defects evident.
22	*Eucalyptus microcorys*	17	.98	NS 15 EW 11	Mature	10m CRZ 5	Medium	This mature tree is dominant has average health and average form for the species. The tree has a lean to light to the North and may need weight reduction. The tree has no significant defects evident.
23	*Cedrus deodora*	16	.52	NS 9 EW 7	Mature	5m CRZ 2.5m	Medium	This mature tree has average health and average form for the species. The tree has no significant defects evident.
24	*Liquidambar styraciflua*	15	.41	NS 8 EW 9	Semi mature	4m CRZ 2m	Medium	This semi mature tree has average health and average form for the species. The tree has no significant defects evident.
24a	*Callistemon viminalis*	7	.20	NS 4 EW 3	Semi mature	2m CRZ 1m	Medium	This semi mature tree has below average health and average form for the species. The tree has no significant defects evident.
25	*Alnus jorullensis*	8	.21	NS 4 EW 5	Semi mature	2m CRZ 1m	Medium	This semi mature tree has average health and average form for the species. The tree has no significant defects evident.
25a	*Alnus jorullensis*	7	.19	NS 4 EW 5	Semi mature	2m CRZ 1m	Medium	This semi mature tree has average health and average form for the species. The tree has no significant defects evident.
26	*Gleditsia triacanthos*	7	.20	NS 8 EW 8	Semi mature	2m CRZ 1m	Medium	This semi mature tree has average health and average form for the species. This tree may need to be crown raised to allow access. The tree has no significant defects evident.

Explanatory Notes for Table

- *Dbh = Diameter of trunk at breast height.
- **TPZ refers to the Tree Protection Zones as recommended by The Ents Tree Consultancy and are to be used in conjunction with the Tree Protection Guidelines in Appendices 3. TPZ based on 10x the trees Dbh for retention of biological function, 5x Dbh for critical root zone and tree stability.
- ***SULE Explanation can be found in Appendix 2.




Plate 1 above left shows tree 1 on site. Plate 2 above left centre shows trees 2 & 5 on site. Plate 3 above right shows tree 3 & 6 on site. Picture 4 above right shows trees 4 & 7 on site.




Plate 5 above left shows tree 5 on site, note the foliage extending towards the south with end weight, some minor pruning would favour this tree. Plate 6 above left centre shows the outer row of figs and thier high crowns raised previously. Plate 7 above right centre shows tree 6 on site. Plate 8 above right shows tree 7 on site.

Plate 9 above left shows tree 8 on site. Plate 10 above right shows trees 10,10a & 11. Plate 11 above right centre shows trees 12 & 13. Plate 12 above right shows tree 9 on site at the SW end of the main walk.



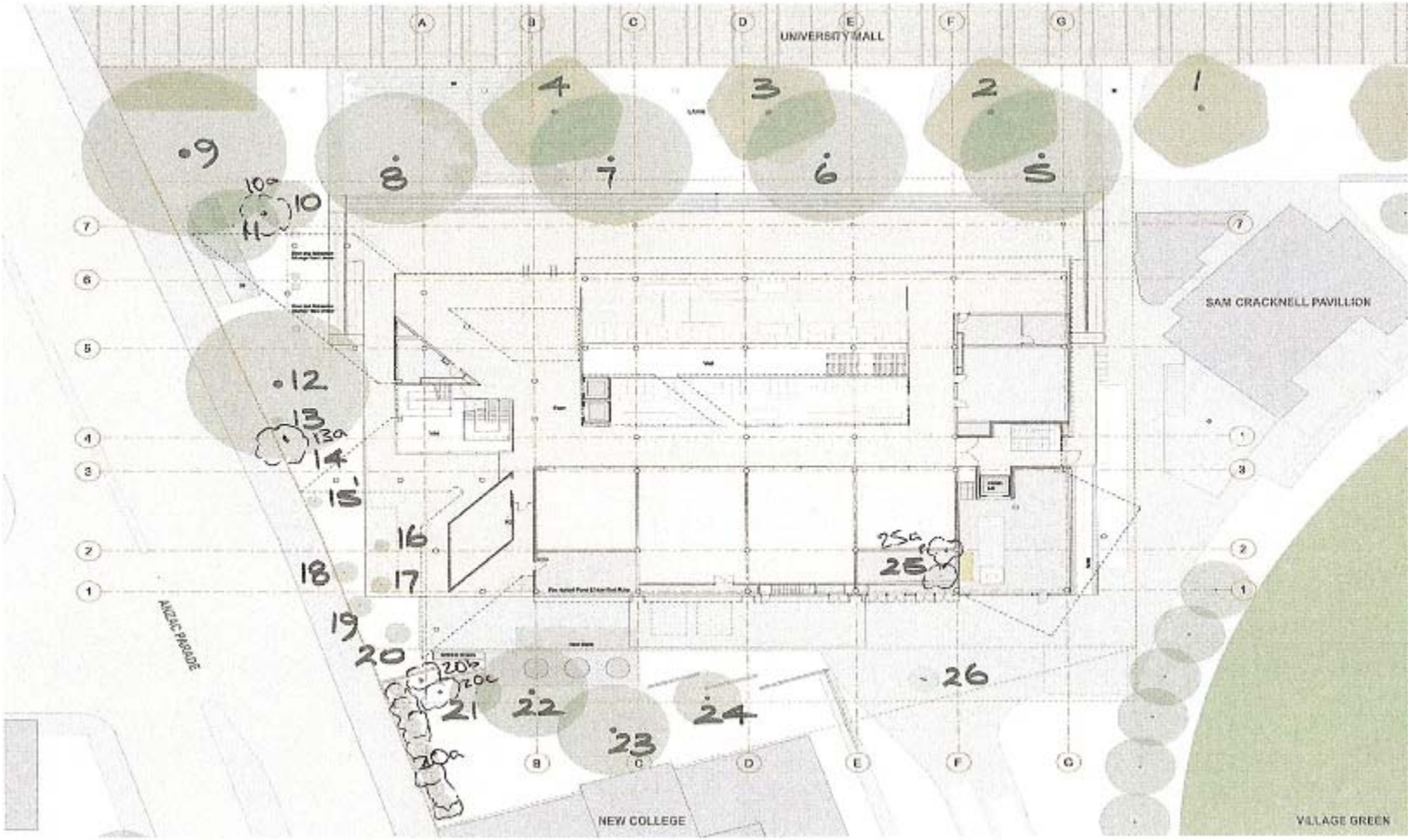
Plate 13 above left shows trees 13a, 14 & 15. Plate 14 above centre shows trees 16 & 17 onsite. Plate 15 above right shows tree 19, please note tree 18 has been removed.



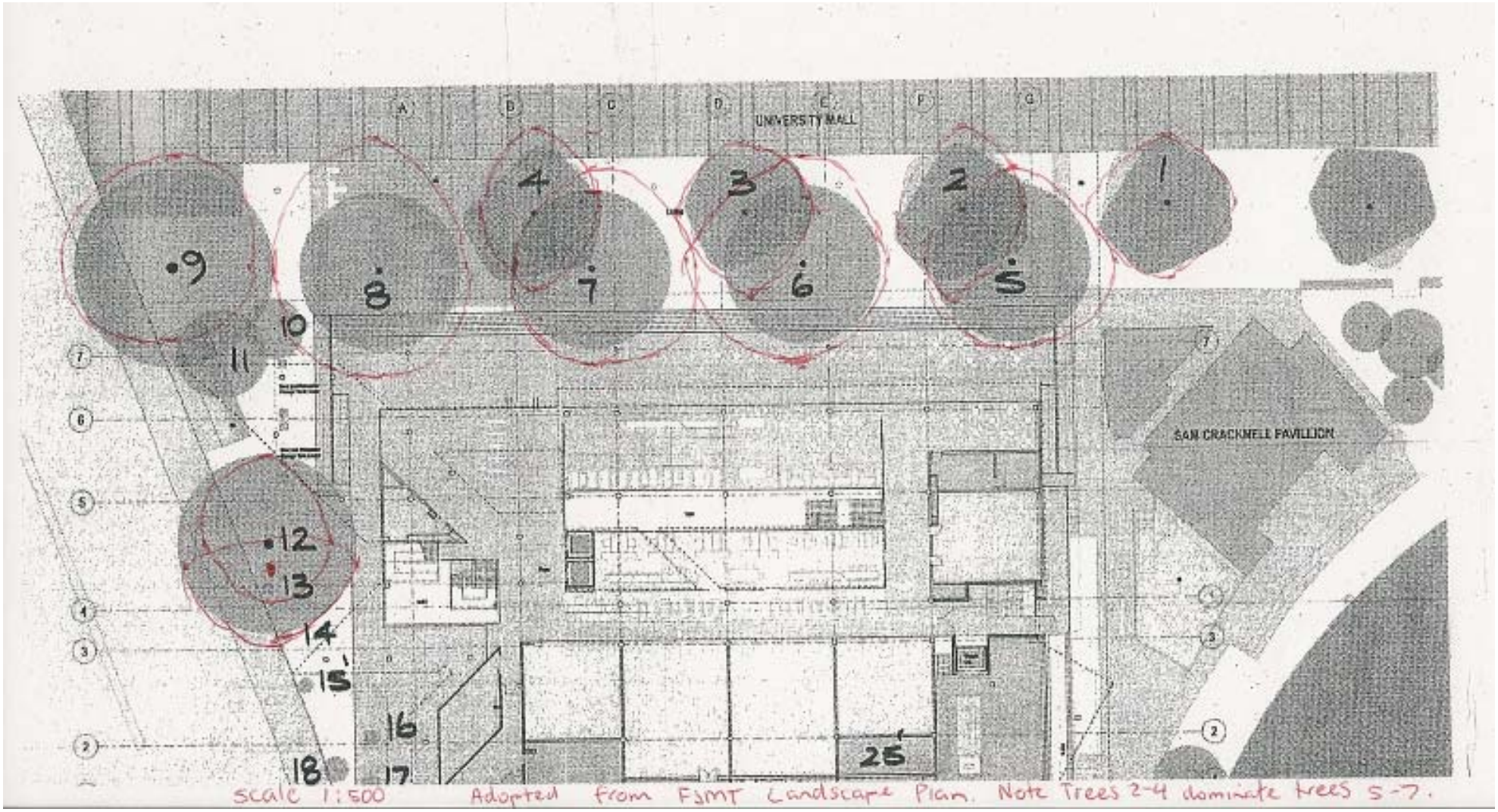
Plate 16 above left shows tree group 20a on site away from the works. Plate 17 shows trees 20b, 20c and tree 21 on site. Plate 18 shows tree 23 on site away from the works.

Plate 19 above left shows tree 24 on site. Plate 20 above centre left shows trees 25 & 25a on site. Plate 21 above centre right shows tree 26 on site. Plate 22 above right shows tree 22 on site.

Site Plan Provided by FJMT, Landscape plan with trees numbered.



Appendix 6 Canopy Plan for nominated trees



Appendix 7 Canopy Table for nominated trees

Tree Numbers	Aspect and Distance to Canopy edge (M=Metres)	Aspects and Heights to canopy from ground level (M=Metres)	Comments
Tree1	North = 5.5m, East 5.5m South=7m, West= 8m	North = 7m, East 10m South=15m, West= 9m	No pruning anticipated for works.
Tree 2	North = 7.5m, East 5m South=7.5m, West= 5.5m	North = 7m, East 15m South=11m, West= 7-12m	No pruning anticipated for works.
Tree 3	North = 5.5m, East 9m South=7m, West= 5.5m	North = 10m, East 4-7m South=15m, West= 11m	No pruning anticipated for works.
Tree 4	North = 7m, East 4m South=5m, West= 4m	North = 7m, East 15m South=16m, West= 16m	No pruning anticipated for works.
Tree 5	North = 9m, East 10m South=7m, West= 7m	North = 3-5m, East 6m South=9-11m, West= 4m	This tree may require minor pruning works to allow for clearance from columns supporting the extended roof on the South side of the tree. Refer to 4.7.2.
Tree 6	North = 9m, East 7m South=8.5m, West= 9.5m	North = 4-7m, East 5m South=6.5m – 8.5m, West= 2-4m	This tree may require minor pruning works to allow for clearance from columns supporting the extended roof on the South side of the tree. Refer to 4.7.2. Low canopy to West of tree.
Tree 7	North = 11m, East 8.5m South=9m, West= 6m	North = 9.5m, East 2-5m South=9-11m, West= 8m	This tree may require minor pruning works to allow for clearance from columns supporting the extended roof on the South side of the tree. Refer to 4.7.2. Low canopy to East of tree.
Tree 8	North = 11m, East 7m South=9m, West= 9.5m	North = 4-5m, East 7-9m South=7-11m, West= 9m	This tree may require minor pruning works to allow for clearance from columns supporting the extended roof on the South side of the tree. Refer to 4.7.2.
Tree 9	North = 9m, East 6m South=6m, West= 9m	North = 2-3m, East 6m South=3m, West= 3-4m	No pruning anticipated for works.
Tree 12	North = 5m, East 5m South=5m, West= 7m	North = 15m, East 12m South=15m, West= 3-4m	Minor pruning to the East of the tree may be required.
Tree 13	North = 1m, East 7m South=6m, West= 7m	North = 16m, East 6m South=3-4m, West= 3-4m	Minor pruning to the East of the tree may be required.

Appendix 8
References

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Appendix 9
Glossary Of Terms

Abiotic	Nonliving
Anthracnose	a fungal disease causing dead areas on the leaves, buds, stems.
Arboriculture	The science and art of caring for trees, shrubs and other woody plants in landscape settings.
Barrier Zone	Protective boundary formed in new wood in response to wounding or other injury.
Biotic	Alive, pertaining to living organisms.
Branch attachment	The structural union of a lateral branch.
Callus	Undifferentiated tissue produced in response to wounding.
Canker	A dead spot or necrotic lesion that is caused by a bark inhabiting organism/pathogen.
Cavity	an open wound characterized by the presence of decay resulting in a hollow.
Collar	the ring of tissue that surrounds the lateral branch at its point of attachment.
Compartmentalization	A physiological process that creates the chemical and physical boundaries that act to limit the spread of disease and decay organisms.
Compression wood	A type of reaction wood that forms on the underside of branches which tends to maintain a branch angle of growth.
Crown	The above ground parts of the tree, including the trunk.
DBH	The diameter of a trees trunk measured at 1.4m.
Decay	Process of degradation of woody tissues by fungi and bacteria through the decomposition of cellulose and lignin.
Decline	Progressive decrease in health of organs or the entire plant usually caused by a series of interacting factors.
Drip line	The width of the crown, as measured by the lateral extent of the foliage.
Epicormic shoot	a shoot that arises from latent or adventitious buds that occur on stems, branches or the bases of trees.
Included bark	Pattern of development at branch junctions where bark is turned inward, rather than pushed out; contrast with the branch nark ridge.
Mortality Spiral	The sequence of events describing a change in the trees health from vigorous to declining to death.
Photosynthesis	The transformation in the presence of chlorophyll and light, of carbon dioxide from (the air) and water (primarily from soil) into a simple carbohydrate and oxygen.
Pruning	systematic removal of branches of a plant usually a woody perennial.
Reaction wood	Specialized secondary xylem that develops in response to a lean or similar mechanical stress to restore the stem to vertical.
Taper	The change in diameter over the length of trunks and branches. Important to mechanical support.
Tension wood	A type of reaction wood that trees form on the upper side of branches and stems and roots.
VTA	Visual Tree Assessment is a method of evaluating structural defects and stability in trees.
Wound	Any injury that induces a compartmentalization response.

Education and Qualifications

- 2005 Diploma of Arboriculture (AQF Cert 5), Ryde TAFE. Distinction.
- 2000 Tree Climbing Course (AQF Cert 2), Ryde TAFE.
- 1999 Advanced Certificate in Urban Horticulture, (AQF Cert 4), Ryde TAFE. Distinction.
- 1995 Greenkeepers Trade Certificate (AQF 3) Ryde TAFE. Credit.
- 1991 Higher School Certificate.
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Conference Attendance/presentation of Scientific Papers

- **Barrell Tree Care Workshop- Trees on Construction Sites (Brisbane 2005)**
- **Tree Logic seminar- Urban Tree Risk Management (Sydney 2005)**
- **Tree Pathology and Wood Decay Seminar Sydney (2004)**
- **Excelsior Training Claus Mattheck (Sydney 2001)**
- **Managing Mature Trees NAAA(Sydney 2000), Presented a Paper "Habitat Value of Mature Trees"**

Industry Experience

- **2004 to Date, Sole Trader The Ents Tree Consultancy.** Writing of tree reports for development applications, master plans, hazard evaluations, tree management plans and expert witness reports. Hazard assessments, tree surveys and consultations.
- **2003 to 2008, Arborist University of New South Wales**. Survey all trees on site, developed a Tree Management Database. Minimise hazard potential of all trees on site through evaluation and works. Generate and prioritise works and tree assessment based areas usage, tree conditions and staff required. Development of UNSW Tree Protection Guidelines for master planning works. Acting Supervisor December 2006 to May 2007.
- **2003 Tree management Officer Randwick Council**. Liaise with public to explain and enforce the councils Tree Preservation order. Management of internal staff and contractors. Project management and co ordination of street tree planting and maintenance.
- **1999 to 2003 Animal Food Production Manager and Arborist.** Management of Koala food Plantation, Management of animal food supply registry for herbivores/omnivores. Coordination of staff contractors and volunteers. Maintain and manage tree management database, complete tree works within zoo grounds and at zoo owned plantations. Acting supervisor 6 month period 2002 for grounds dept and asset management trade team.
- **1998 to 1999 Sole Trader Techniques Lawn & Garden Consultancy.** Lawn, garden and Tree care. Garden design and maintenance. Tree works and tree removal. Installation of irrigation equipment.
- **1997 to 1998 Greenkeeper / Horticulturist Muirfield Golf Course.** General grounds duties, machinery maintenance, horticultural works, tree works
- **1992 to 1997 Greenkeeper / Horticulturist Ashlar Golf Course.** General grounds duties, machinery maintenance, horticultural works, tree works