ARBORICULTURAL IMPACT REPORT

WENONA SCHOOL
NORTH SYDNEY NSW

9 JUNE 2015

PREPARED FOR WENONA SCHOOL

Prepared by:
Guy Paroissien
Landscape Matrix Pty Ltd.
ABN 53 110 564 102
T/F. 9943 6510, M. 0425 342 051
40 Timbarra Road St Ives NSW 2075
E-mail: landscapematrix@optusnet.com.au

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1. BACKGROUND

Landscape Matrix Pty Ltd has been engaged by Wenona School at North Sydney to prepare an Arboricultural Impact Report in respect to 18 trees at or adjacent to its Campus at 255 to 265 Miller Street North Sydney and, in particular, those trees potentially affected by proposed development works at the site.

The site was inspected on 27th October 2014 to collect data for 18 trees on and adjoining the site. This report has been prepared by Guy Paroissien, a Director of Landscape Matrix.

The assessment of the trees was based upon a visual inspection of the trees from ground level using elements of the Visual Tree Assessment (VTA) approach developed by Mattheck & Breloer (1994). The visual inspection included examination of the trees' dimensions, foliage density and foliage health, form, structure, structural condition, overall health and vigour and landscape significance.

The inspection was limited to visual inspection of the trees without dissection, probing or coring. No aerial inspection of the trees was carried out and the assessment did not include any woody tissue testing or root investigation.

The tree heights and canopy spreads were estimated and expressed in metres and the tree diameters at breast height (DBH) were measured with a standard metal tape at approximately 1.4 metres above ground level and expressed in millimetres.

Measurements from the trees referred to in this report are to be taken as if measured from the centre of the trees' trunks.

2. TREES ON SITE

18 trees on or adjoining the site have been assessed in preparing this report. A summary of these trees, their dimensions, condition, Useful Life Expectancy (ULE) and landscape significance is attached in Appendix B. The ULE categories identified in Appendix B follow those of Barrell (1996).

The site has been developed in the past and comprises a school campus with numerous buildings, a child care centre and outdoor recreation areas with a mix of planted Australian and exotic trees and shrubs.

The tree numbers in Appendix B correspond with the tree numbers marked on the attached Werona Project Archimedes Plan prepared by Tonkin Zulaikha Greer Architects. (Appendix C)

The trees that have been assessed on the site are summarised in table 1 as follows:

Table 1: Summary of species assessed, number and height range.

SPECIES	COMMON NAME	NUMBER PRESENT	HEIGHT RANGE (metres)
Acmena smithii	Lilly Pilly	4	11 to 13
Ficus rubiginosa	Port Jackson Fig	1	12
Jacaranda mimosifolia	Jacaranda	2	7 to 10
Lophostemon confertus	Brushbox	2	17 to 18
Phoenix canariensis	Canary Island Date Palm	1	7
Platanus x hybrida	London Plane Tree	5	5 to 20
Sapium sebiferum	Chinese Tallow Tree	1	6
Syzigium paniculatum *	Brush Cherry, Magenta Lilly Pilly	1	11
Ulmus parvifolia	Chinese Elm	1	15
	Total	**18**	**5 to 20**

**Syzigium paniculatum* (Brush Cherry, Magenta Lilly Pilli) is listed on the Schedules of the NSW *Threatened Species Conservation Act 1995*. This species is listed as an endangered species on Schedule 1 of that Act. *Syzygium paniculatum* is also listed as a nationally vulnerable species under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.

However, the specimen of Brush Cherry is considered to be a planted specimen rather than remnant vegetation as this species not recorded as occurring naturally at this locality. Taking this into account it is considered that there will not be a significant impact on threatened species arising from the proposal when applying the relevant test under Section 5A of the Environment Planning and Assessment Act 1979.

3. TREES IDENTIFIED AS A PRIORITY FOR RETENTION/PROTECTION.

The identification of trees as priorities for retention is based upon a number of factors including; species, dimensions, health, maturity, Safe Use and Life Expectancy (SULE) and landscape significance.

Following assessment of the trees it is considered the following 4 trees are of high landscape value and medium to long SULE and warrant consideration as priorities for retention/protection if possible.

Table 2: Trees identified as a priority for consideration for retention/protection.

TREE NO.	SCIENTIFIC AND COMMON NAME	TPZ	SRZ	COMMENTS
3	*Lophostemon confertus* (Brushbox)	9.3 metres	3 metres	A mature, twin trunked specimen approximately 18 metres in height with a canopy spread of 14 metres and trunk diameters at breast height (DBH) of 420 and 610mm. In moderate health and of high landscape significance. Located on the nature strip frontage of the site. The tree displays fair branch attachment with codominant leaders from 1.3 metres and multiple leaders from 2.2 metres with some evidence of poor attachment at the junctions - not considered at risk of failure in the short term. There is evidence of past tissue loss on the NE side of the lower trunk from 0.7 to 1.4 metres - possible canker. There is also evidence of past mechanical injury on the south side at 0.6 to 1.4 metres. At the time of inspection the tree was of moderate health and fair vigour and exhibited reduced foliage size, reduced foliage density and low levels of dieback.
13	*Lophostemon confertus* (Brushbox)	9.6 metres	3.2 metres	A mature, single trunked specimen approximately 17 metres in height with a canopy spread of 13 metres and a DBH of ca. 800mm. In good health and of high landscape significance.
15	*Platanus x hybrida* (London Plane Tree)	6.4 metres	2.9 metres	A mature, single trunked specimen approximately 20 metres in height with a canopy spread of 14 metres and a DBH of 530mm. In good health and of high landscape significance. Located on the nature strip frontage of the site. The tree has a slight canopy bias to the west.
17	*Platanus x hybrida* (London Plane Tree)	6.4 metres	2.8 metres	A mature, single trunked specimen approximately 14 metres in height with a canopy spread of 12 metres and a DBH of 530mm. In good health and of high landscape significance. Located on the nature strip frontage of the site.

* Maximum TPZ under AS4970-2009

A number of methods to determine the likely extent of root zones and appropriate setbacks for tree root protection zones for trees on development sites have been developed in the past. The key criteria used in determining setbacks is the tree's trunk diameter at breast height (DBH) in conjunction with other factors including the sensitivity of the species in question to environmental disturbance/change, the age of the tree and the tree's health and vigour at the time.

Harris et al (2004) provide formulae for calculating tree protection zones based on the above criteria and modified from the 1991 British Standard for protection of trees on construction sites (BS 5837:1991). The 2005 version of the British Standard (BS 5837:2005) recommends a radius of 12 times the tree's DBH. For multi trunked trees BS 5837:2005 recommends a setback of 10 times the basal trunk diameter.

The Australian Standard AS 4970-2009 Protection of Trees on Construction Sites also identifies a 'Tree Protection Zone' (TPZ) of 12 times the tree's DBH. AS 4790-2009 also provides a formula for calculating the "Structural Root Zone' of trees on development sites. In regard to palms, other monocots, cycads and tree ferns the Standard identifies the Tree Protection Zone should not be less than 1 metre outside the crown projection. (Australian Standards Association 2009)

The tree protection zones identified above have been calculated using the Australian Standard 'AS 4970 Protection of trees on construction sites' and are the optimum setback from the trees where disturbance (e.g. soil level changes, compaction, excavation etc) should be minimised to reduce potential impacts on the long term health of the trees.

Preferably, no more than 10% of the tree protection zone should be disturbed with compensation made by extension of other areas of the TPZ to compensate for the area(s) disturbed. Where greater than 10% of the tree protection zone is potentially disturbed the tree's viability needs to be investigated and demonstrated by the project arborist. The structural root zone is the area required for stability and where disturbance of any sort should be avoided.

4. TREES IDENTIFIED FOR CONSIDERATION FOR RETENTION/PROTECTION

The identification of trees for consideration (but not as a priority) for retention is based upon the same factors as those for priority for retention (species, dimensions, health, maturity, Safe Use and Life Expectancy (SULE) and landscape significance). Following assessment of the trees it is considered the following 9 trees are of moderate or moderate to high landscape significance and medium to long SULE and could be considered for protection:

Table 3: Trees identified for consideration for retention/protection.

TREE NO.	SCIENTIFIC AND COMMON NAME	TPZ	SRZ	COMMENTS
1	*Syzigium paniculatum* (Brush Cherry, Magenta Lilly Pilly)	4.2 metres	2.3 metres	A mature, single trunked specimen approximately 11 metres in height with a canopy spread of 9 metres and a DBH of 350mm. In good health and of moderate to high landscape significance. Located on the nature strip frontage of the site. The tree displays fair branch attachment with codominant leaders from 1.7 metres with some evidence of poor attachment at the junction - the junction is a weak point in the tree's structure with increased risk of failure but is not considered at risk of failure in the short term. Exposed woody roots.
4	*Acmena smithii* (Lilly Pilly)	9.6 metres	3 metres	A mature, multi trunked specimen approximately 12 metres in height with a canopy spread of 16 metres and DBH of up to ca. 340mm (ca. 800mm above the root flare). In good health and of moderate to high landscape significance. The tree displays fair to poor branch attachment with multiple leaders form near ground level evidence of poor attachment at the junction - the junction is a weak point in the tree with increased risk of failure (junction not inspected at close range as access to preschool was not available at time of inspection). Crossing branch at 5 metres (with T5).
5	*Acmena smithii* (Lilly Pilly)	6.3 metres	2.5 metres	A mature, multi trunked specimen approximately 11 metres in height with a canopy spread of 8 metres and DBH of ca. 100, 200 and 400mm. In good health and of moderate landscape significance. The tree's past canopy development has been significantly suppressed. The tree displays fair branch attachment with multiple codominant leaders from 1 metre with some evidence of poor attachment at the junction - the junction is a weak point in the tree's structure with increased risk of failure but is not considered at risk of failure in the short term. Crossing branch at 5 metres (with T4).
6	*Acmena smithii* (Lilly Pilly)	4.7 metres	2.4 metres	A mature, twin trunked specimen approximately 13 metres in height with a canopy spread of 11 metres and DBH of ca. 200 and 320mm. In good health and of moderate landscape significance. The tree's past canopy development has been suppressed. The tree displays fair branch attachment with codominant leaders from ground level with some evidence of poor attachment at the junction - the junction is a weak point in the tree's structure with increased risk of failure but is not considered at risk of failure in the short term. Crossing branch at 7 metres (with T7).
7	*Jacaranda mimosifolia* (Jacaranda)	7.2 metres	2.8 metres	A mature, single trunked specimen approximately 10 metres in height with a canopy spread of 16 metres and a DBH of ca. 600mm. In good health and of moderate to high landscape significance. Continued next page…

				At the time of inspection the tree was of fair vigour and exhibited moderate levels of dieback in the upper canopy. Crossing branch at 7 metres (with T6).
10	*Ficus rubiginosa* (Port Jackson Fig)	7.9 metres	2.8 metres	A mature, multi trunked specimen approximately 12 metres in height with a canopy spread of 14 metres and DBH of up to 410mm (660mm above the root flare). In good health and of moderate to high landscape significance. The tree displays fair branch attachment with multiple, codominant leaders from 1.3 metres with some evidence of poor attachment at the junction - the junction is a weak point in the tree's structure with increased risk of failure but is not considered at risk of failure in the short term.
11	*Ulmus parvifolia* (Chinese Elm)	5.3 metres	2.6 metres	A mature, single trunked specimen approximately 15 metres in height with a canopy spread of 12 metres and a DBH of 440mm. In good health and of moderate to high landscape significance. The tree displays fair branch attachment with evidence of past branch failures in the upper canopy. At the time of inspection the tree was of fair vigour and exhibited low to moderate level of dieback in the upper canopy.
16	*Platanus x hybrida* (London Plane Tree)	5 metres	2.4 metres	A mature, single trunked specimen approximately 16 metres in height with a canopy spread of 9 metres and a DBH of 420mm. In good health and of moderate to high landscape significance. Located on the nature strip frontage of the site.
18	*Platanus x hybrida* (London Plane Tree)	4.6 metres	2.5 metres	A mature, single trunked specimen approximately 8 metres in height with a canopy spread of 5 x 9 metres and a DBH of 380mm. In good health and of moderate landscape significance. Located on the nature strip frontage of the site. The tree's canopy bias is due to conflict with the awning of the adjacent building. At the time of inspection the tree was of fair vigour and exhibited low levels of dieback and moderate levels of epicormic growth.

The tree protection zones identified above have been calculated using the Australian Standard AS 4970 Protection of Trees on Construction Sites and are the optimum setback from the trees where disturbance (e.g. soil level changes, compaction, excavation etc) should be minimised to reduce potential impacts on the long term health of the trees.

Preferably, no more than 10% of the tree protection zone should be disturbed with compensation made by extension of other areas of the TPZ to compensate for the area(s) disturbed. Where greater than 10% of the tree protection zone is potentially disturbed the tree's viability needs to be investigated and demonstrated by the project arborist. The structural root zone is the area required for stability and where disturbance of any sort should be avoided.

5. TREES THAT SHOULD BE CONSIDERED FOR REMOVAL

Following assessment of the trees on the site it is considered that none of the trees assessed for this report are recommended for immediate removal and replacement due to declining health, structural issues and/or unsuitability to the site.

6. TREES NOT IDENTIFIED FOR REMOVAL OR RETENTION

Tree numbers 2, 8, 9, 12 and 14 are not considered significant enough to warrant specific design consideration due to either their low landscape significance or their short predicted life expectancy..

7. POTENTIAL IMPACTS ON TREES

The potential impacts of the proposal have been assessed using the Demolition Plan prepared by Tonkin Zulaikha Greer Architects identified as Drawing Number A-1014 and the Site Plan identified as Drawing Number A-1001.

7.1 Trees requiring removal or proposed to be removed to facilitate the proposed multi-purpose school building

It is proposed to remove the following 8 trees to facilitate construction of the proposed Multi-purpose school building.

Table 5: Trees proposed for removal to facilitate construction of the proposed multi-purpose school building.

TREE NUMBER(S)	SCIENTIFIC AND COMMON NAME	COMMENTS*
2	*Phoenix canariensis* (Canary Island Date Palm)	Located within the footprint of the proposed works and identified to be removed as part of the works. NB: If feasible Wenona School may lift this palm, store during construction works and replant this palm at the site in accordance with the attached transplant method statement (Appendix E)
4	*Acmena smithii* (Lilly Pilly)	Located within the footprint of the proposed works and identified to be removed as part of the works.

5	*Acmena smithii* (Lilly Pilly)	Located within the footprint of the proposed works and identified to be removed as part of the works.
6	*Acmena smithii* (Lilly Pilly)	Located within the footprint of the proposed works and identified to be removed as part of the works.
7	*Jacaranda mimosifolia* (Jacaranda)	Located within the footprint of the proposed works and identified to be removed as part of the works.
8	*Acmena smithii* (Lilly Pilly)	Located within the footprint of the proposed works and identified to be removed as part of the works.
9	*Sapium sebiferum* (Chinese Tallow Tree)	Located within the footprint of the proposed works and identified to be removed as part of the works.
10	*Ficus rubiginosa* (Port Jackson Fig)	Located within the footprint of the proposed works and identified to be removed as part of the works.

7.2 Trees potentially impacted by the proposed multi-purpose school building

To facilitate construction of the proposed multi-purpose school building 10 trees that are recommended for retention on or adjacent to the site are in the vicinity of works and may be potentially impacted. The potential impacts are summarised in table 6.

The root zone calculations referred to in this report were made using scale drawings of the trees' identified tree protection zones (TPZ) in a CAD program (TurboCAD®) with potentially affected areas added to the drawing. The area of potential impact was converted to a percentage of TPZ using a spreadsheet (Microsoft Excel®).

The extent of impacts to the trees in table 5 has been rated using the following guideline:
0% of root zone impacted – no impact of significance
0 to 10% of root zone impacted – low level of impact
10 to 15% of root zone impacted – low to moderate level of impact
15 to 20% of root zone impacted – moderate level of impact
20 to 25% of root zone impacted – moderate to high level of impact
25 to 35% of root zone impacted – high level of impact
>35% of root zone impacted – significant level of impact

Table 6: Trees potentially affected by the proposed Multi-purpose school building.

TREE NO.	SCIENTIFIC AND COMMON NAME	TPZ	SRZ	COMMENTS*
1	*Syzigium paniculatum* (Brush Cherry, Magenta Lilly Pilly)	4.2 metres	2.3 metres	The proposed works are outside the identified tree protection zone of the tree – no impact of substance.
3	*Lophostemon confertus* (Brushbox)	9.3 metres	3 metres	The proposed works are outside the identified tree protection zone of the tree – no impact of substance. Some canopy pruning may be required to accommodate the elevated pedestrian walkway – it is recommended the walkway alignment be located to minimise the need to prune the canopy and that all pruning be undertaken in accordcance with AS4373-2007.
11	*Ulmus parvifolia* (Chinese Elm)	5.3 metres	2.6 metres	The proposed works are outside the identified tree protection zone of the tree – no impact of substance.
12	*Jacaranda mimosifolia* (Jacaranda)	2.8 metres	1.9 metres	The proposed works are outside the identified tree protection zone of the tree – no impact of substance.
13	*Lophostemon confertus* (Brushbox)	9.6 metres	3.2 metres	The proposed works are outside the identified tree protection zone of the tree – no impact of substance.
14	*Platanus x hybrida* (London Plane Tree)	2* metres	1.8 metres	The proposed works are outside the identified tree protection zone of the tree – no impact of substance.
15	*Platanus x hybrida* (London Plane Tree)	6.4 metres	2.9 metres	The proposed works are outside the identified tree protection zone of the tree – no impact of substance.
16	*Platanus x hybrida* (London Plane Tree)	5 metres	2.4 metres	The proposed works are outside the identified tree protection zone of the tree – no impact of substance.
17	*Platanus x hybrida* (London Plane Tree)	6.4 metres	2.8 metres	The proposed basement is located 2.93 metres from the tree at the closest point and is calculated to encroach within 28.09m^2 or 22.12% of the tree's identified TPZ – this is a moderate to high level of impact with potential to affect the tree's long term health and reduce its ULE. However, this species is resilient to moderate to high levels of disturbance and, providing significant structural roots are not impacted, it is anticipated the impacts will be within an acceptable threshold.
18	*Platanus x hybrida* (London Plane Tree)	4.6 metres	2.5 metres	The proposed basement is located 2.74 metres from the tree at the closest point and is calculated to encroach within 5.83m^2 or 8.93% of the tree's identified TPZ – this is a low level of impact and within an acceptable threshold for the tree.

The TPZ encroachments to the trees in the vicinity of the proposed works can be summarised as follows:
0% of root zone impacted – no impact of significance = 7 trees (tree #s 1, 3, 11, 12, 13, 14, 15 and 16)
0 to 10% of root zone impacted – low level of impact = 1 trees (tree # 18)
20 to 25% of root zone impacted – moderate to high level of impact = 1 trees (tree # 17)

In summary:

- The proposed works are outside the identified TPZ of tree numbers 1, 3, 11, 12, 13, 14, 15 and 16. It is not considered there will be any impact of substance on these trees and, with appropriate protection and management, they can be retained at their existing level of health.
- The proposed works will impact on 8.93% of the TPZ of tree number 18 - this is a low to moderate level of impact and within an acceptable threshold for this tree.
- The proposed works will impact on 20 to 25% of the TPZ of tree number 17- this is a moderate to high level of impact with potential to affect the tree's long term health and reduce its ULE. However, this species is resilient to moderate to high levels of disturbance and, providing significant structural roots are not impacted, it is anticipated the impacts will be within an acceptable threshold.

Due to the proximity of tree numbers 11, 17 and 18 to the existing and proposed buildings these trees will require particular attention to protection during both the demolition and construction phases if impacts are to be maintained within acceptable thresholds.

At a minimum these trees will require the installation of trunk and ground protection, in accordance with Figure 4 of AS4970-2009, prior to commencement of any works at the site. The measures identified in Figure 4 of AS4970-2009 are illustrated in the sketch diagram in Appendix D.

8. TREE PROTECTION MEASURES

The following generic tree protection measures are recommended to assist in minimising potential impacts that may arise during the demolition and construction phases if the precinct is to undergo redevelopment (including the implementation of landscape works on the site).

A. Measures to be implemented prior to the commencement of any works on the site.

1. Tree to be retained are to be clearly identified by signage as protected trees.

2. The tree protection zones of trees to be retained are to be protected by fencing during the entire construction period except for specific areas directly required to achieve construction works.

3. The tree protection fence shall be constructed of galvanised pipe at 2.4 metre spacing and connected by securely attached chain mesh fencing to a minimum height of 1.8 metres and shall be installed prior to work commencing.

4. The tree protection fencing shall be installed as closely as possible to the alignment of the identified tree protection zone and shall be approved and certified by the site arborist prior to commencement of any construction or demolition works on the site.

B. Measures to be implemented and maintained during the life of construction works on the site.

5. Any excavation within the identified root protection zones of trees to be retained shall be carried out by hand to minimize disturbance to tree roots. Roots greater than 25mm are not to be damaged or severed without prior assessment by an arborist to determine likely level of impact and the restorative actions required to minimise the impacts of root damage.

6. Tree roots between 10mm and 25mm diameter, severed during excavation, shall be cut cleanly by hand by an experienced Arborist/Horticulturist with a minimum qualification of the Horticulture Certificate or Tree Surgery Certificate.

7. The following activities/actions are prohibited from the tree protection zones:

- Soil cut or fill including excavation and trenching
- Soil cultivation, disturbance or compaction
- Stockpiling storage or mixing of materials
- The parking, storing, washing and repairing of tools, equipment and machinery
- The disposal of liquids and refueling
- The disposal of building materials
- The sitting of offices or sheds
- Any action leading to the impact on tree health or structure

8. Canopy pruning of trees identified for protection which is necessary to accommodate approved building works shall be undertaken in accordance with Australian Standard 4373-2007 'Pruning of Amenity Trees'.

9. USE OF TREES BY WILDLIFE

During the site inspection on 27th October 2014 the trees on the site were checked for signs of use by wildlife.

None of the trees exhibited signs of usage by wildlife such as scratch marks on their trunks or scats under their canopies that were most likely made by a Common Brushtail Possum (*Trichosurus vulpecula*) or Common Ringtail Possum (*Pseudocheirus peregrinus*).

It is probable that a number of the trees would be used by native fauna at various times for food, shelter and roosting purposes and the retention and/or replacement of trees on the site will retain this opportunity.

The following bird species was noted on the site (or heard calling in the immediate vicinity) during the inspection on 8th September 2014: Noisy Miner (*Manorina melanocephala*).

10. CONCLUSION

Of the 18 trees on or adjoining the site that has been assessed 4 of the trees has been identified as having high landscape value and as a priority for retention. An additional 9 trees have been identified as worthy of specific consideration for retention/protection if possible.

None of the trees assessed for the report has been identified as recommended for immediate removal, regardless of the proposal, due to identified health or structural issues. The remaining 5 trees are identified in section 6 of the report as not requiring specific design consideration.

To facilitate construction of the proposed multi-purpose school building the following 8 trees are proposed for removal:
Tree # 2 *Phoenix canariensis* (Canary Island Date Palm)
Tree # 4 *Acmena smithii* (Lilly Pilly)
Tree # 5 *Acmena smithii* (Lilly Pilly)
Tree # 6 *Acmena smithii* (Lilly Pilly)
Tree # 7 *Jacaranda mimosifolia* (Jacaranda)
Tree # 8 *Acmena smithii* (Lilly Pilly)
Tree # 9 *Sapium sebiferum* (Chinese Tallow Tree)
Tree # 10 *Ficus rubiginosa* (Port Jackson Fig)

It is noted that replacement tree plantings are proposed in the new landscape areas. Given these factors it is considered the proposed removals are within an acceptable threshold.

NB: If feasible Wenona School proposes to lift tree number 2 (Date Palm), store during construction works and replant this palm at the site in accordance with the attached transplant method statement (Appendix E)

To facilitate construction of the proposed multi-purpose school building the following 10 trees are proposed to be retained and may be potentially affected:
Tree # 1 *Syzigium paniculatum* (Brush Cherry, Magenta Lilly Pilly)
Tree # 3 *Lophostemon confertus* (Brushbox)
Tree # 11 *Ulmus parvifolia* (Chinese Elm)
Tree # 12 *Jacaranda mimosifolia* (Jacaranda)
Tree # 13 *Lophostemon confertus* (Brushbox)
Tree # 14 *Platanus x hybrida* (London Plane Tree)

Tree # 15 *Platanus x hybrida* (London Plane Tree)
Tree # 16 *Platanus x hybrida* (London Plane Tree)
Tree # 17 *Platanus x hybrida* (London Plane Tree)
Tree # 18 *Platanus x hybrida* (London Plane Tree)

The TPZ encroachments to the trees in the vicinity of the proposed works can be summarised as follows:
0% of root zone impacted – no impact of significance = 7 trees (tree #s 1, 3, 11, 12, 13, 14, 15 and 16)
0 to 10% of root zone impacted – low level of impact = 1 trees (tree # 18)
20 to 25% of root zone impacted – moderate to high level of impact = 1 trees (tree # 17)

In summary:

- The proposed works are outside the identified TPZ of tree numbers 1, 3, 11, 12, 13, 14, 15 and 16. It is not considered there will be any impact of substance on these trees and, with appropriate protection and management, they can be retained at their existing level of health.
- The proposed works will impact on 8.93% of the TPZ of tree number 18 - this is a low to moderate level of impact and within an acceptable threshold for this tree.
- The proposed works will impact on 20 to 25% of the TPZ of tree number 17- this is a moderate to high level of impact with potential to affect the tree's long term health and reduce its ULE. However, this species is resilient to moderate to high levels of disturbance and, providing significant structural roots are not impacted, it is anticipated the impacts will be within an acceptable threshold.

Due to the proximity of tree numbers 11, 17 and 18 to the existing and proposed buildings these trees will require particular attention to protection during both the demolition and construction phases if impacts are to be maintained within acceptable thresholds.

At a minimum these trees will require the installation of trunk and ground protection, in accordance with Figure 4 of AS4970-2009, prior to commencement of any works at the site. The measures identified in Figure 4 of AS4970-2009 are illustrated in the sketch diagram in Appendix D.

Generic tree protection measures are recommended in section 8 of this report to minimise potential impacts to the trees to be retained.

Guy Paroissien, MAIH, MIACA, MISA
M Env. Mgt & Restor., Dip. Arboriculture, Hort Cert., Tree Care Cert.
Director, Landscape Matrix Pty Ltd
9 June 2015

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APPENDIX A

Photograph 1: Tree # 1 – Illustrating the codominant leaders from 1.7 metres with some evidence of poor attachment at the junction.

Photograph 2: Tree # 1 – Illustrating the exposed woody roots ad adjacent infrastructure.

Photograph 3: Tree # 2 – Illustrating the location and context.

Photograph 4: Tree # 3 – Illustrating the location and context.

Photograph 5: Tree # 3 – Illustrating the evidence of past mechanical injury on the south side at 0.6 to 1.4 metres.

Photograph 6: Tree # 7 – Illustrating the moderate levels of dieback in the upper canopy.

Photograph 7: Tree # 10 – Illustrating the multiple, codominant leaders from 1.3 metres with some evidence of poor attachment at the junction.

Photograph 8: Tree # 8 – Illustrating the close proximity to buildings, retaining walls etc.

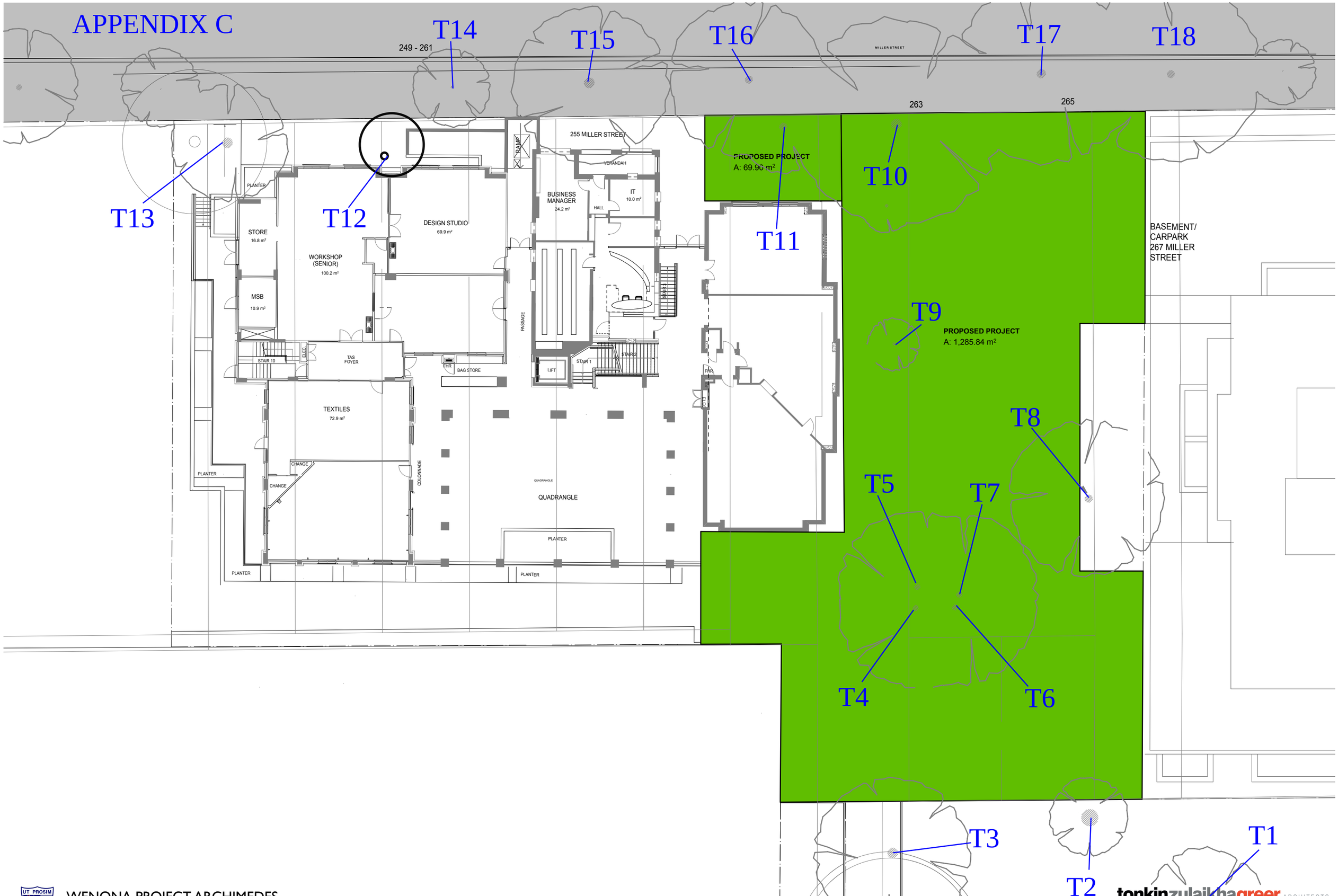
APPENDIX B - TREE DATA SUMMARY - WENONA SCHOOL NORTH SYDNEY

Tree No.	*Genus, Species (Common Name)*	Height (m)	Canopy (m)	DBH (mm)	DBH for TPZ	DGL for SRZ	Foliage Condition	Age Class	Trunk	Trunk Lean	Crown balance	Past Pruning	Stability	Branch Attachment	Health	Vigour	Dead Wood	Pest or disease	ULE	Landscape Significance	Retention Value*	Comments
1	*Syzigium paniculatum* (Brush Cherry, Magenta Lilly Pilly)	11	9	330 x 370	350	415	Good foliage condition	Mature	Single trunk	Upright trunk	Balanced canopy area	Lower limbs pruned in past to 3 metres	Appears stable	Fair branch attachment	Good health	Good vigour	<5%	No visual evidence of significant pest or disease	2 Medium (15 to 40 years)	Moderate to high landscape significance	2	Located on the nature strip frontage of the site. The tree displays fair branch attachment with codominant leaders from 1.7 metres with some evidence of poor attachment at the junction - the junction is a weak point in the tree's structure with increased risk of failure but is not considered at risk of failure in the short term. Exposed woody roots.
2	*Phoenix canariensis* (Canary Island Date Palm)	7	8	940	N/A	N/A	Good foliage condition	Mature	Single trunk	Upright trunk	Balanced canopy area	No evidence of significant past pruning	Appears stable	N/A	Good health	Good vigour	<5%	No visual evidence of significant pest or disease	1 Long (> 40 years)	Low to moderate landscape significance	3	Located in narrow landscape strip between two driveways.
3	*Lophostemon confertus* (Brushbox)	18	14	420, 610	775	820	Fair foliage condition	Mature	Twin trunked	Upright trunk	Majority of canopy to the north	Lower limbs pruned in past to 6 metres	Appears stable	Fair branch attachment	Moderate health	Fair vigour	5 to 10%	Past tissue loss on NE side of trunk from 0.7 to 1.4 metres - possible canker	2 Medium (15 to 40 years)	High landscape significance	1	Located on the nature strip frontage of the site. The tree displays fair branch attachment with codominant leaders from 1.3 metres and multiple leaders from 2.2 metres with some evidence of poor attachment at the junctions - not considered at risk of failure in the short term. There is evidence of past tissue loss on the NE side of the lower trunk from 0.7 to 1.4 metres - possible canker. There is also evidence of past mechanical injury on the south side at 0.6 to 1.4 metres. At the time of inspection the tree was of moderate health and fair vigour and exhibited reduced foliage size, reduced foliage density and low levels of dieback.
4	*Acmena smithii* (Lilly Pilly)	12	16	Up to ca. 340 (ca. 800 above root flare)	800	800	Good foliage condition	Mature	Multi trunked	Upright trunk	Majority of canopy to the SE	Lower limbs pruned in past to 4 metres	Appears stable	Fair to poor branch attachment	Good health	Good vigour	<5%	No visual evidence of significant pest or disease	2 Medium (15 to 40 years)	Moderate to high landscape significance	2	The tree displays fair to poor branch attachment with multiple leaders form near ground level evidence of poor attachment at the junction - the junction is a weak point in the tree with increased risk of failure (junction not inspected at close range as access to pre school was not available at time of inspection). Crossing branch at 5 metres (with T5).
5	*Acmena smithii* (Lilly Pilly)	11	3	Ca. 100, 200 and 400	525	500	Good foliage condition	Mature	Multi trunked	Upright trunk	Majority of canopy to the west	No evidence of significant past pruning	Appears stable	Fair branch attachment	Good health	Good vigour	<5%	No visual evidence of significant pest or disease	2 Medium (15 to 40 years)	Moderate landscape significance	2	The tree's past canopy development has been significantly suppressed. The tree displays fair branch attachment with multiple codominant leaders from 1 metre with some evidence of poor attachment at the junction - the junction is a weak point in the tree's structure with increased risk of failure but is not considered at risk of failure in the short term. Crossing branch at 5 metres (with T4).
6	*Acmena smithii* (Lilly Pilly)	13	11	Ca. 200, 320	390	450	Good foliage condition	Mature	Twin trunked	Upright trunk	Balanced canopy area	No evidence of significant past pruning	Appears stable	Fair branch attachment	Good health	Good vigour	5%	No visual evidence of significant pest or disease	2 Medium (15 to 40 years)	Moderate landscape significance	2	The tree's past canopy development has been suppressed. The tree displays fair branch attachment with codominant leaders from ground level with some evidence of poor attachment at the junction - the junction is a weak point in the tree's structure with increased risk of failure but is not considered at risk of failure in the short term. Crossing branch at 7 metres (with T7).
7	*Jacaranda mimosifolia* (Jacaranda)	10	16	Ca. 600	600	700	Deciduous (none)	Mature	Single trunk	Upright trunk	Majority of canopy to the south	Lower limbs pruned in past to 4 metres	Appears stable	Sound branch attachment	Good health	Fair vigour	5 to 10%	No visual evidence of significant pest or disease	2 Medium (15 to 40 years)	Moderate to high landscape significance	2	At the time of inspection the tree was of fair vigour and exhibited moderate levels of dieback in the upper canopy. Crossing branch at 7 metres (with T6).
8	*Acmena smithii* (Lilly Pilly)	13	12 x 16	Up to ca. 400 (ca. 600 above root flare)	600	600	Good foliage condition	Mature	Multi trunked	Upright trunk	Balanced canopy area	Lower limbs pruned in past to 4 metres, upper branches pruned on NE and SW for buildings	Appears stable	Fair to poor branch attachment	Good health	Fair vigour	5%	No visual evidence of significant pest or disease	3 Short (5 to 15 years)	Moderate to high landscape significance	3	The tree displays fair to poor branch attachment with multiple leaders from approx. 1.4 metres - the junction is a weak point in the tree with increased risk of failure (junction not inspected or seen as access to pre school was not available at time of inspection). At the time of inspection the tree was of fair vigour and exhibited low levels of dieback. Short ULE due to very close proximity to buildings, retaining walls etc.

Tree No.	*Genus, Species (Common Name)*	Height (m)	Canopy (m)	DBH (mm)	DBH for TPZ	DGL for SRZ	Foliage Condition	Age Class	Trunk	Trunk Lean	Crown balance	Past Pruning	Stability	Branch Attachment	Health	Vigour	Dead Wood	Pest or disease	ULE	Landscape Significance	Retention Value*	Comments
9	*Sapium sebiferum* (Chinese Tallow Tree)	6	6	160, 200	270	310	Good foliage condition	Semi Mature	Twin trunked	Upright trunk	Balanced canopy area	No evidence of significant past pruning	Appears stable	Sound branch attachment	Good health	Fair vigour	10%	No visual evidence of significant pest or disease	2 Medium (15 to 40 years)	Low to moderate landscape significance	3	At the time of inspection the tree was of fair vigour and exhibited low levels of dieback.
10	*Ficus rubiginosa* (Port Jackson Fig)	12	14	Up to 410 (560 x 760 above root flare)	660	660	Good foliage condition	Mature	Multi trunked	Upright trunk	Balanced canopy area	Lower limbs pruned in past to 4 metres, centre branches pruned on west for OH wires	Appears stable	Fair to poor branch attachment	Good health	Good vigour	<5%	No visual evidence of significant pest or disease	2 Medium (15 to 40 years)	Moderate to high landscape significance	2	The tree displays fair branch attachment with multiple, codominant leaders from 1.3 metres with some evidence of poor attachment at the junction - the junction is a weak point in the tree's structure with increased risk of failure but is not considered at risk of failure in the short term.
11	*Ulmus parvifolia* (Chinese Elm)	15	12	420 x 460	440	560	Good foliage condition	Mature	Single trunk	Upright trunk	Balanced canopy area	Lower limbs pruned in past to 3 metres, upper branches pruned on east for building and west for OH wires	Appears stable	Fair branch attachment	Good health	Fair vigour	5 to 10%	No visual evidence of significant pest or disease	1 Long (> 40 years)	Moderate to high landscape significance	2	The tree displays fair branch attachment with evidence of past branch failures in the upper canopy. At the time of inspection the tree was of fair vigour and exhibited low to moderate level of dieback in the upper canopy.
12	*Jacaranda mimosifolia* (Jacaranda)	7	8	230	230	270	Deciduous (none)	Semi Mature	Single trunk	Distinct trunk lean to NW	Majority of canopy to the NW	Lower limbs pruned in past to 3 metres, centre branches pruned on west for OH wires	Appears stable	Sound branch attachment	Good health	Good vigour	<5%	No visual evidence of significant pest or disease	2 Medium (15 to 40 years)	Low to moderate landscape significance	3	The tree's past canopy has been suppressed.
13	*Lophostemon confertus* (Brushbox)	17	13	Ca. 800	800	900	Good foliage condition	Mature	Single trunk	Upright trunk	Balanced canopy area	Lower limbs pruned in past to 4 metres, upper branches pruned on NE for building and west for OH wires	Appears stable	Sound branch attachment	Good health	Good vigour	<5%	No visual evidence of significant pest or disease	1 Long (> 40 years)	High landscape significance	1	
14	*Platanus x hybrida* (London Plane Tree)	5	6	150	150	220	Good foliage condition	Semi Mature	Single trunk	Upright trunk	Balanced canopy area	Lower limbs pruned in past to 2.5 metres, upper branches pruned in centre for OH wires	Appears stable	Sound branch attachment	Good health	Good vigour	<5%	No visual evidence of significant pest or disease	1 Long (> 40 years)	Low landscape significance	3	Located on the nature strip frontage of the site.
15	*Platanus x hybrida* (London Plane Tree)	20	14	530	530	710	Good foliage condition	Mature	Single trunk	Slight trunk lean to the west	Majority of canopy to the west	Lower limbs pruned in past to 3 metres, upper branches pruned in centre for OH wires	Appears stable	Sound branch attachment	Good health	Good vigour	<5%	No visual evidence of significant pest or disease	1 Long (> 40 years)	High landscape significance	1	Located on the nature strip frontage of the site. The tree has a slight canopy bias to the west.
16	*Platanus x hybrida* (London Plane Tree)	16	9	420	420	460	Good foliage condition	Mature	Single trunk	Slight trunk lean to the west	Majority of canopy to the west	Lower limbs pruned in past to 3 metres, upper branches pruned in centre for OH wires	Appears stable	Sound branch attachment	Good health	Good vigour	<5%	No visual evidence of significant pest or disease	1 Long (> 40 years)	Moderate landscape significance	2	Located on the nature strip frontage of the site.

Tree No.	*Genus, Species (Common Name)*	Height (m)	Canopy (m)	DBH (mm)	DBH for TPZ	DGL for SRZ	Foliage Condition	Age Class	Trunk	Trunk Lean	Crown balance	Past Pruning	Stability	Branch Attachment	Health	Vigour	Dead Wood	Pest or disease	ULE	Landscape Significance	Retention Value*	Comments
17	*Platanus x hybrida* (London Plane Tree)	14	12	530	530	680	Good foliage condition	Mature	Single trunk	Upright trunk	Balanced canopy area	Lower limbs pruned in past to 3 metres, upper branches pruned in centre for OH wires	Appears stable	Sound branch attachment	Good health	Good vigour	<5%	No visual evidence of significant pest or disease	1 Long (> 40 years)	High landscape significance	1	Located on the nature strip frontage of the site.
18	*Platanus x hybrida* (London Plane Tree)	8	5 x 9	380	380	520	Good foliage condition	Mature	Single trunk	Upright trunk	Majority of canopy to the west	Lower limbs pruned in past to 4 metres, upper branches pruned in centre for OH wires	Appears stable	Sound branch attachment	Good health	Fair vigour	5%	No visual evidence of significant pest or disease	2 Medium (15 to 40 years)	Moderate landscape significance	2	Located on the nature strip frontage of the site. The tree's canopy bias is due to conflict with the awning of the adjacent building. At the time of inspection the tree was of fair vigour and exhibited low levels of dieback and moderate levels of epicormic growth.
ca = approximate diameter at breast height (DBH) estimated from nearest property boundary or fence where trees were located on adjoining properties																						
* Retention Values: 1 - High (Priority for retention); 2 - Moderate (Consider for retention); 3 - Low or short ULE (Not warranting specific design consideration) and 4 - Remove (very short ULE, structurally unsound, weed species etc.)																						

APPENDIX C



WENONA PROJECT ARCHIMEDES

Tuesday, 18 November 2014

1:250 @ A3

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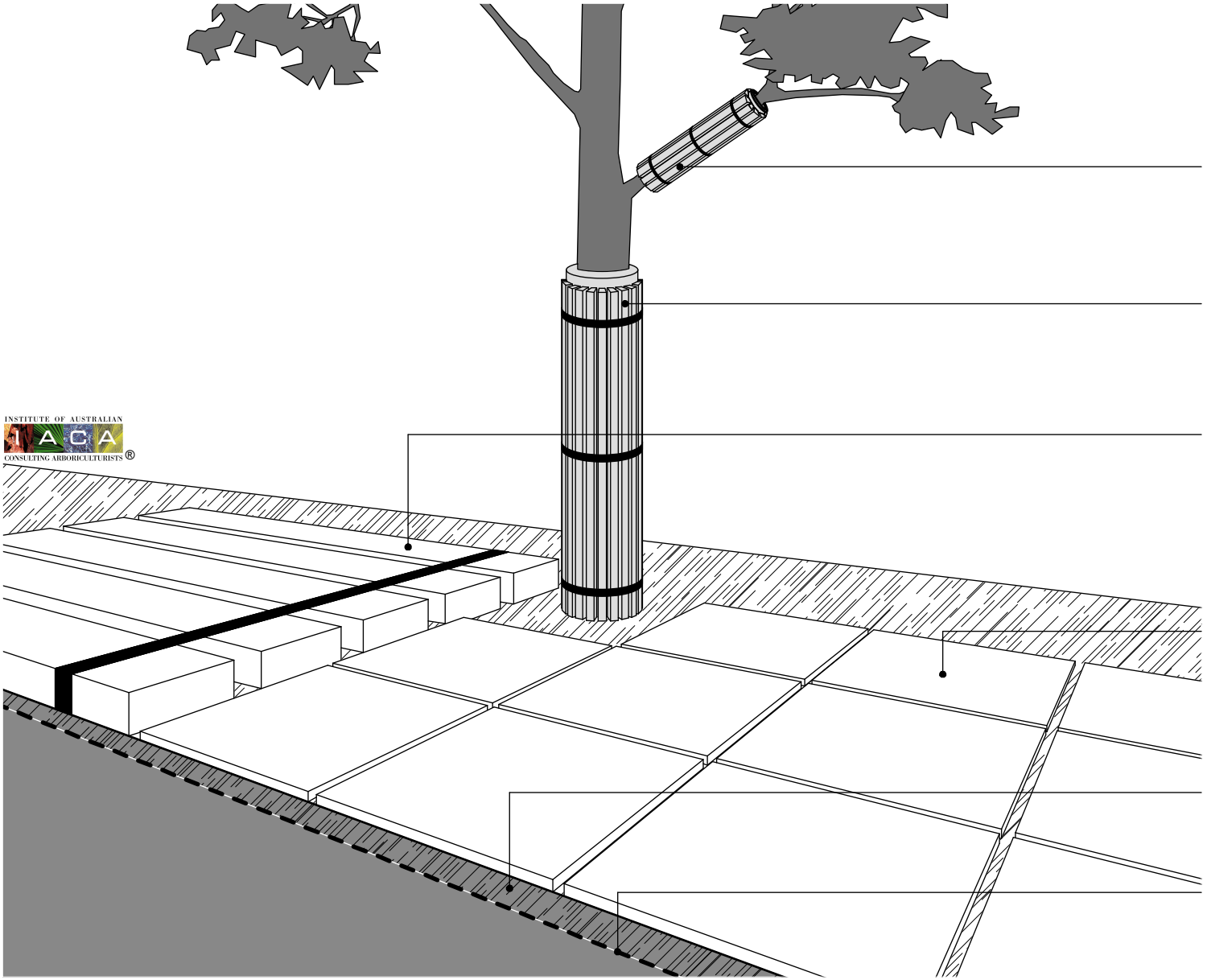
APPENDIX D



Branch Protection - use boards and padding to prevent damage to bark on branch. Boards are to be strapped, not screwed or nailed to the branch.

Trunk Protection - use boards and padding to prevent damage to bark (minimum 2m). Boards are to be strapped, not screwed or nailed to the trunk.

Ground Protection - use device strapped over mulch or aggregate layer. Ground protection device should be of a suitable thickness to prevent soil compaction and root damage.

Steel plates (or approved equivalent) with or without mulch or aggregate layer below.

Maximum 100mm and minimum 50mm depth mulch or aggregate layer.

Geotextile fabric underneath mulch or aggregate layer.

04 Examples of Branch, Trunk and Ground Protection

Not to Scale

APPENDIX E

Transplantation of *Phoenix canariensis* (Canary Island Date Palm)
Wenona School North Sydney

Transplanting of the Date Palm will be undertaken by a suitably experienced contractor with demonstrated experience in the successful transplantation and re-establishment of advanced trees and palms. The following steps will be undertaken by the appointed contractor to maximize the successful transplantation of the Date Palm:

A. Pre-transplantation

Where possible, the Date Palm is to be transplanted during autumn, winter or early spring.
A minimum of 4 weeks before transplantation Date Palm is to be root pruned at the extremity of the proposed root ball and the trench backfilled with coarse organic soil mix and treated with a root growth hormone to promote new root growth.
Appropriate protection will be provided on the day of transplantation to minimise potential damage to the trunk and fronds of the Date Palm to be transplanted.
The Date Palm is to be transplanted direct to the new location on site rather than being stored on site for planting at a later date (unless the construction program prohibits this course of action).

B. Preparation of transplantation site

The planting hole is to be excavated to double the intended root ball size and backfilled with available site soil.
The planting hole is to be tested to ensure drainage is adequate prior to planting the transplanted the Fan Palm.

C. Transplantation method

The appointed transplantation contractor will determine the most effective method for transplantation depending upon:

- Size and dimensions.
- Distance to be transplanted.
- Timing of transplanting; and
- Existing infrastructure in the vicinity of the root ball.

D. Storage

If the Date Palm cannot be directly transplanted to its final locations it is to be stored on or off site in a suitable location protected from potential mechanical injury.
The Date Palm is to be stored in a container or material suitable to retain the rootball in stable condition and monitored on a weekly basis to ensure the rootball does not dry out.

E. Post transplantation aftercare

The following minimum requirements will apply to transplanted Date Palm:

- Remove damaged and/or broken fronds.
- The Date Palm is to be replanted at original soil depth.
- The Rootball area is to be mulched to a depth of 100mm of woodchip.
- Date Palm to be sprayed with a broad spectrum micronutrient spray following transplantation.

- The Date Palm is to be hand watered 3 times weekly for the 1st 4 weeks after transplanting (as required depending on natural rainfall).
- The Date Palm is to be hand watered weekly after 1st 4 weeks for a period of 12 weeks (as required depending on natural rainfall).

If deemed necessary by the contactor, the Date Palm is to be appropriately supported by wire stays for 6 months following transplantation to allow for regrowth of roots and minimise potential for wind throw.