# PRELIMINARY

# ARBORICULTURAL IMPACT

# REPORT

## THE SYDNEY ARC – UNIVERSITY OF SYDNEY

## PROJECT FEASIBILITY PLAN
## &
## CONCEPT DESIGN STAGE

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## APPENDICES

## 1.0 INTRODUCTION

This report has been commissioned by Cameron Kline, Project Manager for Jones Lang LaSalle as a component of the Project Feasibility Plan and Concept Design stage for the proposed Sydney Arc, University of Sydney.

The aims of this report are to:

- Review the vegetation that may be potentially affected by the proposed development
- Provide a broad-based arboricultural impact statement
- Provide a broad assessment of the retention value of the trees most likely to be affected,
- Make general comments on the proposed staging of the works; and
- Make general recommendations for the protection of high value trees.

The area inspected is shown in Appendix 1. For the purposes of this report, the site has been divided into precincts based on the proposed staging of the works.

- **Precinct 1** - Stage 1works - includes the northern end of St Johns playing fields and the boundary between St John's College and the University of Sydney, the existing entrance from Parramatta Road into the Veterinary Science Faculty and associated buildings including The Cattery (Building B07) and buildings B21 and B20.

- **Precinct 2** - Stage 2 includes the boundary between the playing fields from Building B20 to the northern corner of the H.K. Ward Gymnasium (Building D08) and includes the McMaster Annex (BO2B) and the R.M.C. Gunn Buildings (B19, B19A). It also includes the carpark and cricket practice nets on the western side of H.K. Ward Gymnasium.

- **Precinct 3** - Stage 3 includes the H.K. Ward Gymnasium, the Missenden unit of RPA Hospital and the car park plantings at the south-eastern end of the St John's playing fields.

Each precinct has been divided into 'sub-precincts' based on ownership of the land. Comments are given for the trees in each sub-precinct.

The trees were visually assessed from the ground on 13th May 2007 for the criteria given in the Excel spreadsheet (attachment 2). Not all trees were individually assessed but some were considered as part of a group.

The trees on the Sydney University Campus were surveyed by the author of this report in June 2001 and were assigned numbers. These trees are shown on the survey plan: 'Veterinary Science Detail' sourced from The University of Sydney Facilities Management Office by JLL and dated 20.04/07. The trees in St John's College were

assigned numbers which are shown on the marked up on this plan [Attachment 1 – Plan] and on the accompanying excel spreadsheet [Attachment 2 – on the disc].

General recommendations for the protection of trees on development sites are included as Appendix 3.

## 2.0 PRECINCT 1

This precinct contains some of the most significant trees on the proposed development site. It also includes the largest amount of canopy cover of any precinct (see Appendix 2 – Aerial photograph).

### 2.1 St John's Boundary

On the St John's boundary with Parramatta Road are four mature *Populus deltoides* (Cottonwood) in poor to average condition (Figure 1). They appear to be the remnants of what may have been a row of these trees. They are in average to poor condition. The three trees closest to the proposed development are included in the excel spreadsheet as trees SJ1-3. On the corner of the boundary with St John's and The University of Sydney is a mature *Washingtonia filifera* (Cotton Palm) in good condition but nearing its maximum size and probable life span.

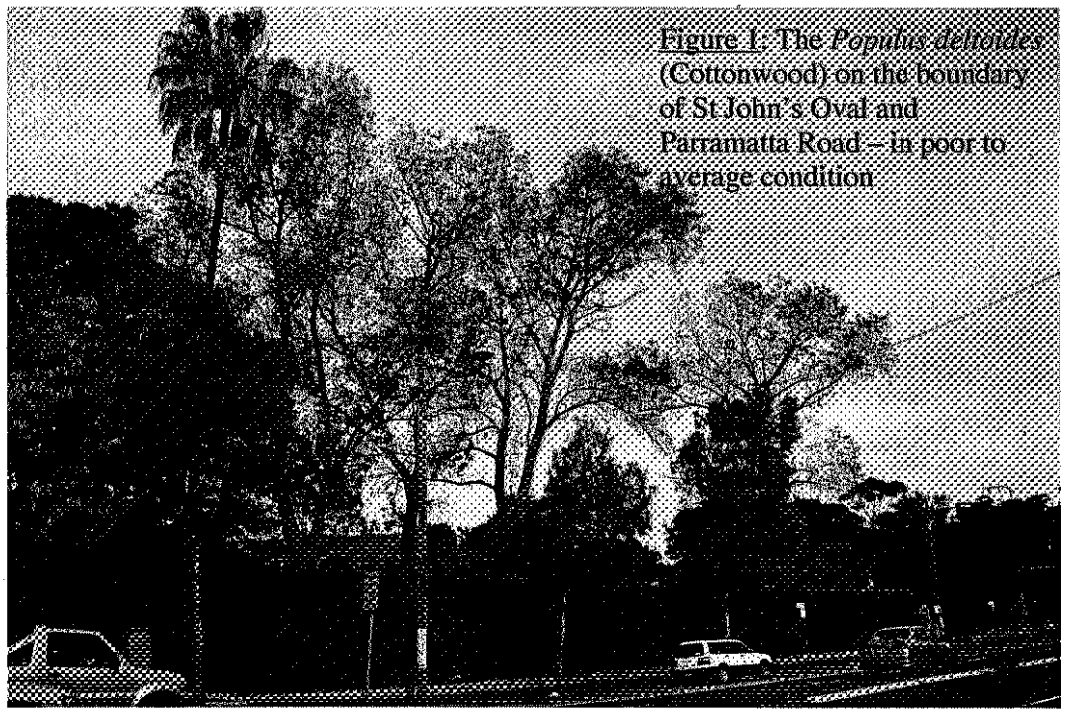


Figure 1: The *Populus deltoides* (Cottonwood) on the boundary of St John's Oval and Parramatta Road – in poor to average condition

The majority of the green canopy aong the St John's College boundary with the University consists of weed species such as *Celtis australis* (Hackberry/ Celtis), *Olea africana* (African Olive) and *Ligustrum* spp. (Privet) (Figure 2). These trees were not

surveyed individually despite some of the Celtis being at least 12 metres high and over 35 cm in diameter. There overall retention value is considered to be low despite the fact that they provide a strong visual screen between the two properties and contribute significantly to overall canopy cover. It is highly likely that most of these weed species are self-seeded and not planted although *Celtis australis* and *Olea africana* have been used as ornamental plants throughout the University grounds. The City of Sydney lists African Olive and Privet as exempt from the Tree preservation Order. Celtis and Camphor laurels are exempt if they are under 10 m in height or 300 mm in diameter at 1m.

Figure 2: The majority of the vegetation along the boundary between St John's playing fields and the University of Sydney consists of weedy species such as *Celtis australis*, African Olive and Privet

Amongst the weedy species are a number of planted trees. The most significant are five *Ficus macrophylla* (Morton Bay Fig) located as a group in the north-eastern section of the St John's boundary (Figure 3). They are in very good health with no obvious significant structural defects. They are approximately 14 m high and tree SJ 9 extends approximately 9 m over the adjacent university car park. A Brush Tail Possum was seen in one of these trees. *Ficus* spp are important food sources for a number of birds and mammals. They have a high retention value as a group. These trees will require protection during construction.

Figure 3: Several of the mature and healthy Morton Bay Figs in the north-eastern corner of the St John's playing fields.

The other visually significant trees in this group along the boundary are a *Populus deltoides* and several *Eucalyptus* spp. including two Tallowwoods (*E. microcorys*) and a Sydney Blue Gum (*E. saligna*). Of these trees, the most worthy of retention is tree SJ23, a Tallowwood with a height of approximately 18 m and a spread in the north-west direction of about 14 m (Figure 4). The Cottonwoods along the Parramatta Road frontage and others on the St John's site, appear to have been planted at the same time and may once have formed part of a more formal avenue which has now disappeared.

Figure 4: Tallowwood – Tree SJ23 located behind the feed store and Old Ram's Shed. This tree is in good health and condition and is worthy of retention.

There are a number of native species that appear to have been planted at much the same time and quite close together. These include other Eucalypts, *Angophora costata*, *Grevillea robusta* (Silky Oak), *Casuarina* spp and *Lophostemon confertus* (Brush Box). Apart from the Eucalypts mentioned in the previous paragraph, most of these trees make little individual contribution but do contribute to the overall screen. A number of these trees showed signs of being used by possums. They are in average condition and form but are considered to have a low retention value.

## 2.2 Veterinary Science

Of the trees within the University, there are several that are likely to be impacted by the proposed development. The concept plan appears to show an new entrance from Parramatta Road between the Gatekeeper's Lodge (B03) and a row of three *Ficus microcarpa* var. *hillii* (Hill's Fig) that are currently in the middle of the existing car park.

The trees that will be affected by this proposed entrance are the three remaining *Lophostemon confertus* (Brush Box) behind the Fig hedge along Parramatta Road, the Brush Box and Jacaranda on the western side of the Caretaker's Cottage, the three Hill's

Figs in the car park, and a very good specimen of a Jacaranda on the western end of the Incinerator building (B09A). The Fig Hedge consists of clipped Hill's Figs and is considered to be a significant element of the landscape along the Parramatta Road boundary. By necessity, any extension or alteration to the entrance will involve the removal of part of the hedge. Figure 6 shows the Fig Hedge to the east of the current entrance.

The most significant trees in this area are the three Hill's Figs in the car park (Figure 5). They have an approximate height of about 12 –14 metres and a spread of about 30 m. They provide excellent shade. The aerial photograph (Appendix 3) shows the contribution that these trees make to the canopy of this precinct. Figures 6 and 7 show the trees from different view points. They have a high retention value. The creation of a new vehicular entrance adjacent to these trees would require the substantial lifting of the canopy.

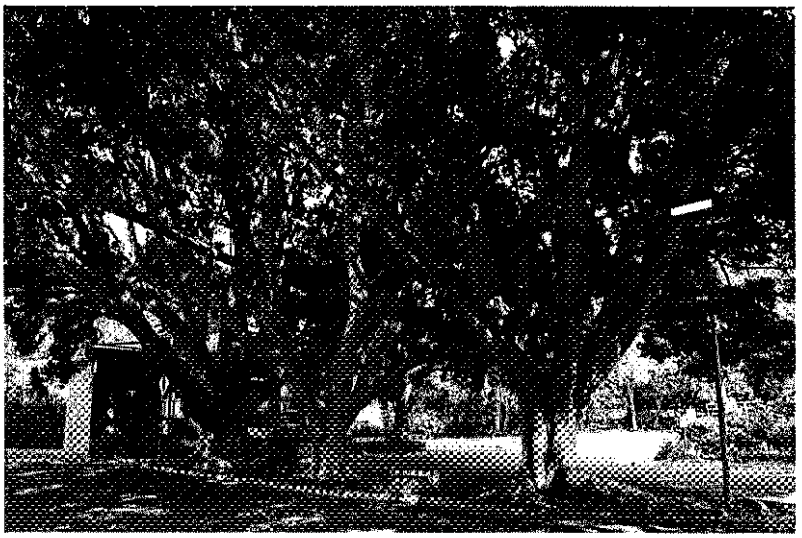
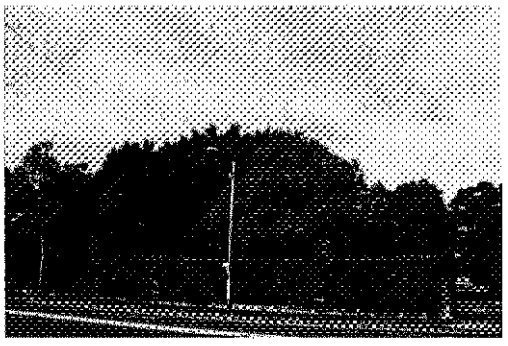


Figure 5: Three Hill's Figs in the Veterinary Clinic car park. A new vehicular entrance would require substantial pruning of these trees.

Figure 7: below shows these trees from the west



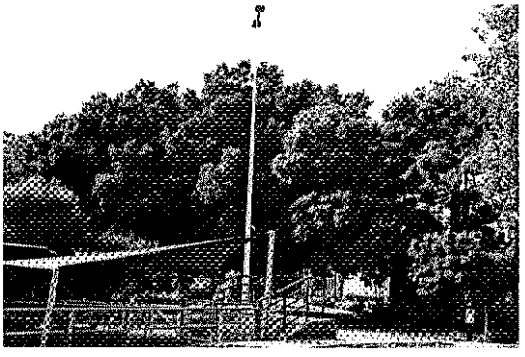


Figure 6: The same trees visible from the opposite side of Parramatta Road.

The Brush Box along Parramatta Road are in average to poor condition and have only a moderate retention value. The trees on the western side of the Gatekeeper's Lodge are in good condition and should be retained.

Apart from the Fig Hedge, there are no other significant trees in this section of the University that are worthy of retention. There are several young Eucalypts near the Sand Roll House and western car park.

## 3.0 PRECINCT 2

This precinct includes the boundary between the playing fields from Building B20 to the northern corner of the H.K. Ward Gymnasium (Building D08) and includes the McMaster Annex (BO2B) and the R.M.C. Gunn Buildings (B19, B19A). It also includes the carpark and cricket practice nets on the western side of H.K. Ward Gymnasium.

### 3.1 St John's boundary

As with precinct 1, this boundary between the University and the St John's playing fields consists of many weedy species and groups of native trees. Trees SJ24 and 25 are suppressed Eucalypts with poor form. SJ27 and 28 are two Silky Oaks of reasonable form and vigour but with a low retention value.

The most significant trees in this area are three *Populus deltoides* (Figure 8). Tree SJ26 is approximately 18-20 m high and a north-south spread of about 20 metres. It is in average condition and there are no obvious defects. This is a very large and visually significant tree. Trees SJ29 and 30 are a pair of Cottonwoods of similar height. These are also quite visually significant when viewed from St John's College. These three trees have a moderate to high retention value.

Figure 8: Trees SJ26 (left), SJ29 (centre) and SJ30 (right) viewed from St John's College

There is a row of *Populus nigra 'Italica'* (Lombardy Poplar) along what may be the boundary between St John's College and the University on the western side of a car park and cricket practice nets behind H.K. Ward Gymnasium (Figure 9). These trees are over-mature and in poor condition. They have a low retention value. The rest of this green strip consists of numerous Celtis.

Figure 9: Lombardy Poplars near cricket practice nets

## 3.2 University

The concept plan appears to show the removal of the McMaster Annex (B02, B02A, B02B) and the R.M.C. Gunn Building (B19, B19A). This would require the removal of a number of trees on the northern and southern sides of the Gunn Building.

The trees along the northern side of the Gunn Building are a mixed planting of native species including *Callistemon* spp. (Bottlebrush), *Casuarina* spp., *Melaleuca* spp and *Agonis flexuosa* (Willow Myrtle) (Figure 10). These trees have no particular significance and as such, have a low retention value.

On the southern side of this building is a planting of six trees including *Callistemon* spp, *Agonis flexuosa* and *Coymbia citriodora* (Lemon-scented Gum). The tallest Lemon-scented gum is a very good specimen (Figure 11).

On the eastern side of this building (the front entrance) are two *Melaleuca quinquenervia* (Broad-leaved paperbark) planted very close to the building and some Callistemons. These trees have a low retention value. Opposite this entrance and planted along the

boundary of University Oval No 2 are two *Eucalyptus bicostata* (Southern Blue Gum). These trees are over-mature and could be removed as part of any re-development of this area (Figure 12).

Figure 10: Trees on the northern side of the Gunn Building

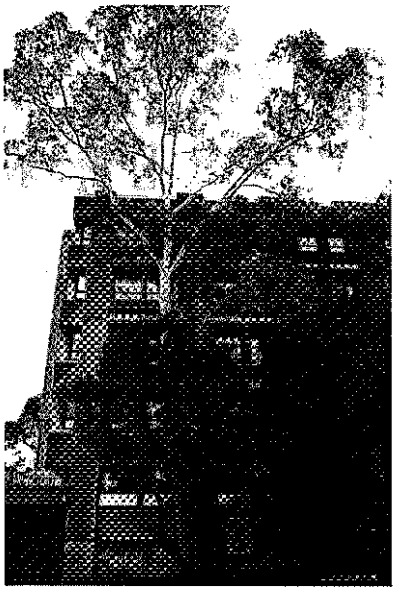


Figure 11: Excellent specimen of a Lemon-scented Gum on the southern side of the Gunn Building

Figure 12: *Eucalyptus bicostata* on the perimeter of Oval 2 – the trees are over-mature

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This precinct includes the surrounds of the H.K. Ward Gymnasium, the Missenden unit of RPA Hospital and the car park plantings at the south-eastern end of the St John's playing fields.

## 4.1 St John's

The trees on the south-eastern side of the car park have been variously affected by the adjacent works on Royal Prince Alfred Hospital. The worst affected are several Brush Box and Eucalypts (Figure13). Many ripped-out roots were in evidence on the RPAH side of the fence (Figure 14). The remainder of the root zone has been severely compacted. Several trees are still in reasonably good condition including a Jacaranda, palm and *Ficus rubiginosa* (Port Jackson Fig) (Figure 15).

On the opposite side adjacent to the turfed area are several Poplars and Eucalypts in average to poor condition. There are some Camphor laurels and other weedy species at the western end. There is one semi-mature Cotton Palm in excellent condition that could be transplanted however, it is surrounded by asphalt and is within metres of a high pressure gas line (Figure 16).

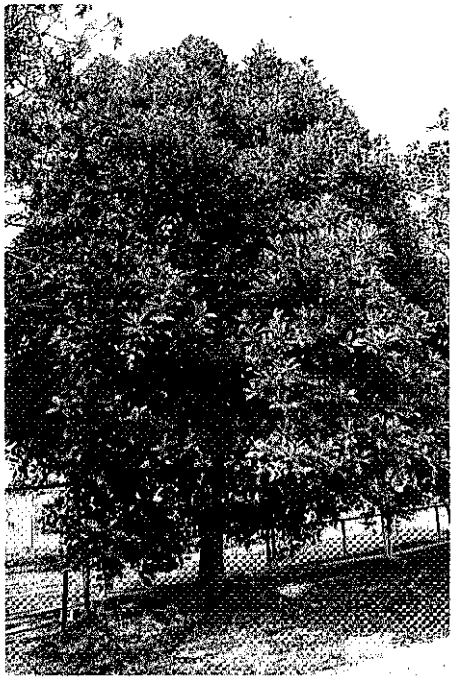


Figure 15: Port Jackson Fig – in good condition at this stage – a possible transplant

Figure 16: A palm that could be transplanted if the nearby gas pipeline can be avoided

## 4.2 University

On the western side of the H.K. Ward gymnasium is a relatively new native landscape. On the western side of the path is a group planting of *Tristaniopsis laurina* (Water Gum). None of these trees is any taller than 3 m and thus they could be transplanted.

On the eastern side is a planting of about 10 *Eucalyptus saligna* and *Corymbia citriodora* with an under-planting of *Grevillea* spp. and *Lomandra sp* (Figure 17). *The* tallest of these trees is about 12m with a diameter at breast height of about 26 cm. These are semi-mature trees of good potential but a low retention value. The most visually important trees in this section are two of a group of three mature *Corymbia citriodora.* These are excellent specimens (Figure 18). There is also a semi-mature- mature *Brachychiton acerifolius* (Illawarra Flame Tree) and a *Livistona autralis* (Cabbage tree palm). These two plants could be transplanted.

The eastern side of the H.K. Ward gym fronts oval number 2. Opposite the front entrance is a mature *Ficus rubiginosa* (Port Jackson Fig) in good health. It has a high retention value. (Figure 19). Other nearby trees are mature *Lophostemon confertus* (Brush Box) which form groups and avenues. They are in reasonably good condition despite the close planting and compacted rootzones (Figure 20). Tree 1067 has had mechanical damage to

the trunk due to its location within the car park. Tree 1066 is a Coral Tree with evidence of previous failures. It does not have a high retention value.

Most of the perimeter of Oval 2 is planted with *Eucalyptus bicostata* (Southern Blue Gum). Most of these have been declining for a number of years.

Figure 17: Group planting of Lemon-scented Gums and Blue Gums. The Flame tree on the left could be considered for transplanting,

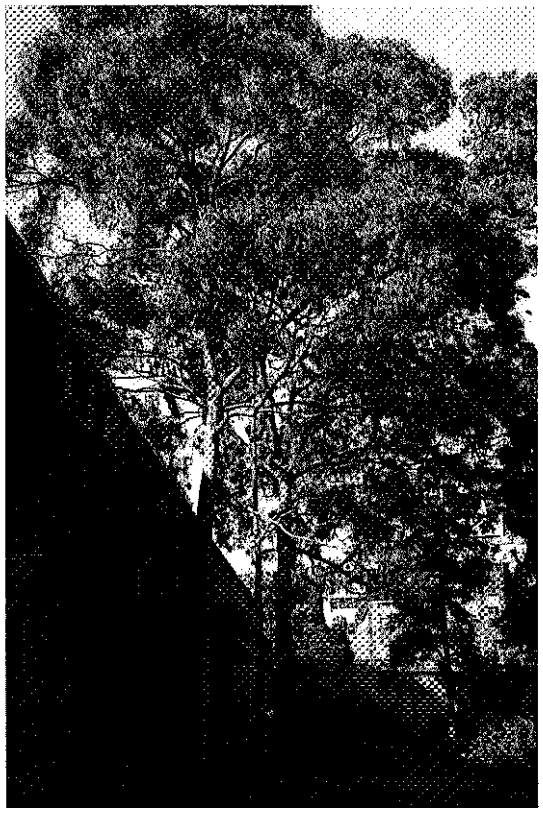


Figure 18: A group of three Lemon-scented Gums on the western side of the H.K. Ward Gymnasium; these trees are of moderate to high retention value due to their health, form and size.

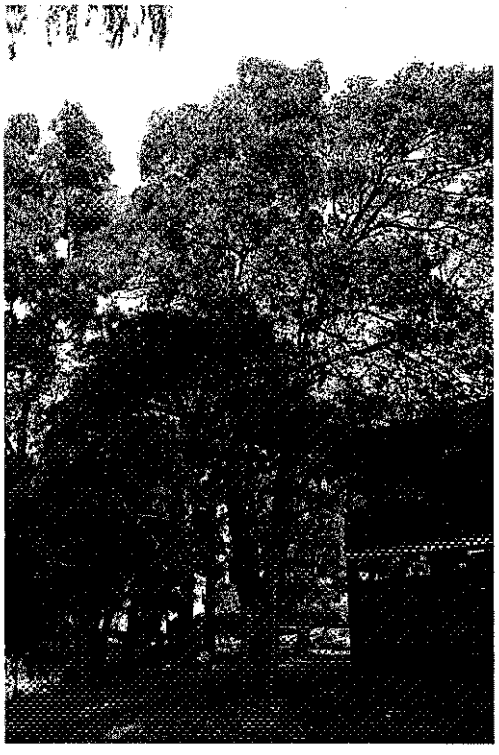


Figure19: Various Brush Box in the car park adjacent to the H.K. Ward Gym – in average to poor condition due to competition and compaction

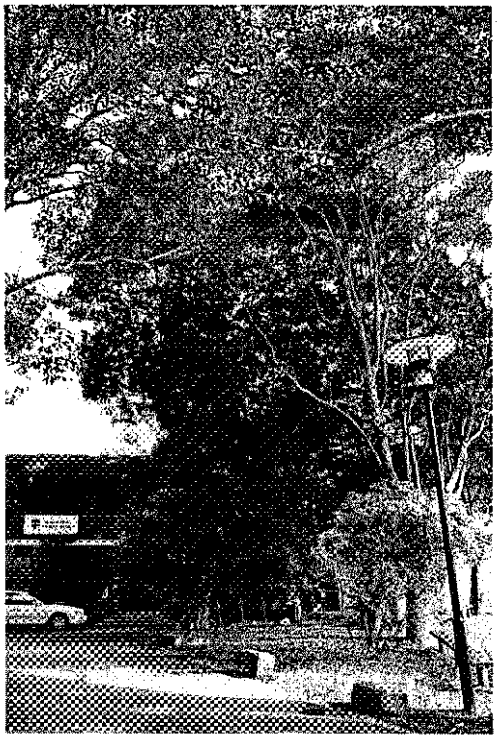


Figure 20: The Port Jackson Fig at the entrance to the H.K. Ward gym should be retained.

## 4.3 RPAH

On the northern side of the Centenary Institute is the Missenden Psychiatric Unit of RPAH. There are some Jacarandas on the eastern side and a mixture of Jacaranda and *Gleditsia cvs* on the north-western side. None of these has a high retention value should the building be demolished. There is one Cotton palm in good condition that could be transplanted if practical.

## 5.0 SUMMARY OF OBSERVATIONS

The area containing the greatest number of significant trees and those with the highest retention value is in that area proposed to be developed at stage 1, i.e Precinct 1. This includes a group of five mature *Ficus macrophylla* (Morton Bay Figs) on the northern end of St John's Oval, the three mature *Ficus microcarpa* var. *hillii* (Hill's Fig) in the car park adjacent to the University of Sydney Veterinary Clinic and the Fig hedge along Parramatta Road. The overall ratio of canopy coverage to area is greatest in this precinct.

The remainder of this precinct consists of either weedy species or trees that could easily be replaced in a new landscape.

Precinct 2, or stage 2, contains several mature *Populus deltoides* (Poplars) and *Eucalyptus* spp that are visually significant, particularly when viewed from St John's College. The remaining trees in this precinct are either weedy species, trees that are over-mature or trees that could easily be replaced.

Precinct 3 has few trees of high retention value. The most important is the *Ficus rubiginosa* (Port Jackson Fig) at the entrance to the H.K. Ward Gymnasium. The group of *Corymbia citriodora* (Lemon-scented Gums) at the rear of this building is also worthy of retention.

If these trees are to be retained, measures must be put in place at the planning and design stage to ensure that they remain viable for the long-term.

Overall, there are few trees of high retention value on this site. Much of the vegetation consists of 'weed' species and trees that are in poor condition or that are quite easily replaced through the provision of adequate space for landscaping. However, collectively, there is a significant amount of vegetation that currently provides a visual barrier between the sporting fields and the service buildings of the Veterinary Science Faculty. It also provides other environmental benefits including habitat and biodiversity values, shade, air filtering and so on.

Given the proven environmental and other benefits provided by trees, provision must be made to ensure canopy replacement.

## 6.0 GENERAL COMMENTS ON STAGING AND THE PROPOSED DEVELOPMENT

If serious consideration is to be given to existing trees that are worthy of retention, it would seem appropriate to reconsider the location and the staging of the project.

The most visually degraded and least treed area is that on the southern end of the St John's playing fields between the playing fields and the new development in Royal Prince Alfred Hospital. This area is currently an unsealed car park. The few viable trees in this area could be transplanted and the others removed prior to construction.

In my opinion, this should be where the first stage of development should occur. It should be further to the west of the current proposal for stage 3. Shifting the development into this area could be a means of avoiding developing the area containing the greatest number of significant trees. It would also seem, to the casual observer, that the current land use (i.e. car park), would lend itself more readily for development and with far less disruption to the day-to day functioning of the university than the current proposal for stage 1 (Veterinary Faculty and significant trees). Appendix 2 shows the possible alternate location for stage 1 and the area most worthy of retention.

Even if the proposed development cannot be relocated then the proposed third stage should become the new first stage. At each stage, consideration must be given to providing adequate space for a sustainable landscape and the establishment of a new tree canopy. If this is done correctly, new trees can achieve a reasonable stature before the next stage of the development [this assumes that the trees will be protected during development].

Unfortunately, many of the current landscape designs being implemented will not provide significant or long-term canopy. This is usually due to poor site assessment, inappropriate species choice, poor stock selection, inadequate soil preparation or provision for appropriate root volumes, poor planting practices and insensitive tree/ lawn maintenance practices. Many new landscape designs are good examples of style over substance. A good example of this is the new landscape associated with the new building on the RPAH site adjacent to the car park at the southern end of the St John's College playing fields (Figures 21 & 22).

Figure 21: Debatable choice of species in a very limited planting area; an example of style over substance with little consideration given to the future development of this landscape.

Figure 22: Over-planted poor quality stock. This is designed to fail.

If it is not possible to extend the development into the St John's car park, then another option that might achieve the retention of the significant trees in precinct one is to delete Atrium 1 from the proposal and move the buildings further to the south.

Serious consideration should also be given to retaining the existing entrance from Parramatta Road as to relocate it to the location shown on the concept plan would require extensive and damaging intervention with the three Hill's Figs that are currently in a car park.

## 7.0 CONCLUSIONS

Established trees of good health and vigour represent an asset to any development site and to the community that eventually occupies that development. This also applies to new landscapes.

Trees are living organisms that require certain environmental conditions in order to maintain their value as an asset. As remediation of badly stressed or damaged trees is rarely successful, damage must be avoided or minimised during the construction phase. Hence if trees are to be retained and their requirements met, procedures that ensure the protection of trees must be in place at all stages of the development. The only stage at which this is achievable is at the planning stage.

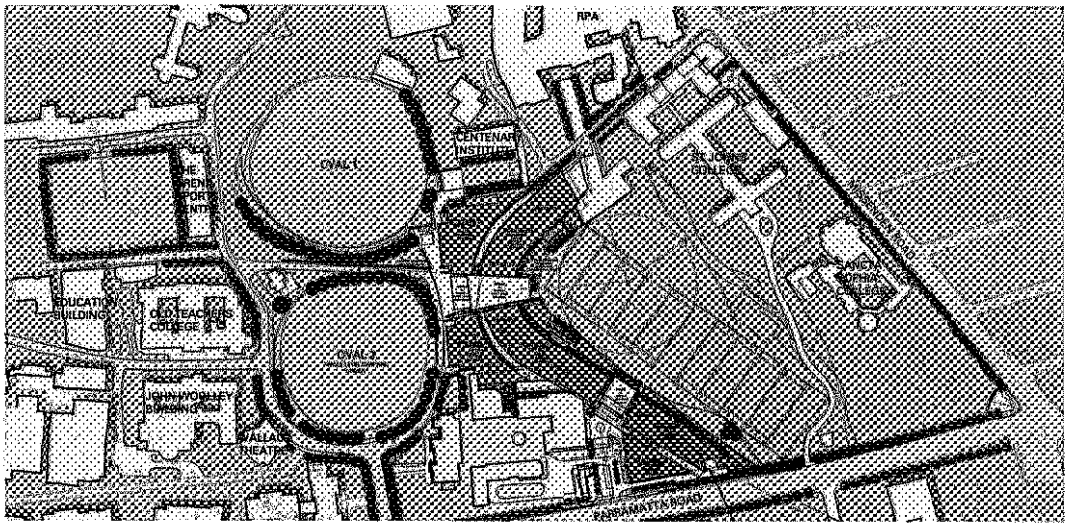
Successful and long-term preservation of trees on development sites depends on understanding the constraints of the tree and the site and achieving a workable compromise. In order for this to happen it is desirable in these complex projects that a consulting arborist be a member of the project team that plans and refines the design of the buildings and the surrounding landscape.

Tree protection measures must be planned and specified and be an integral part of the documentation of the project. These measures must be implemented prior to demolition and supervised throughout the entire development process, including the landscape stage. The consulting arborist can also assist by writing the specifications for the supply, installation and maintenance of new trees. A general overview of tree protection in given in Appendix 3.

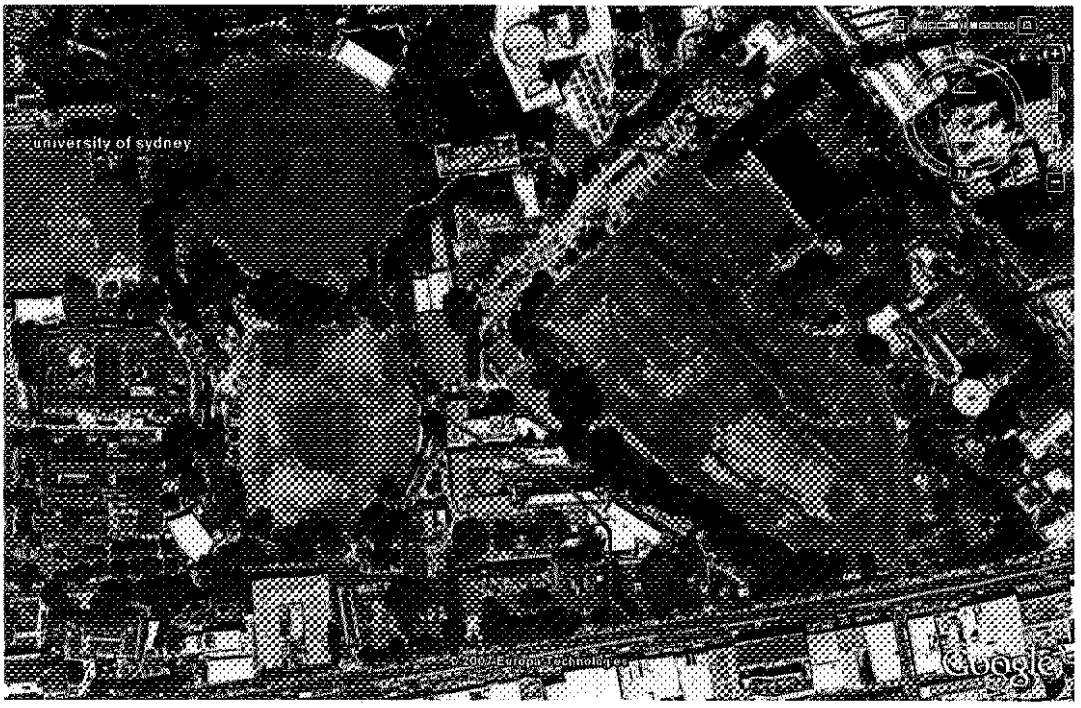
Thankyou for the opportunity to comment on the potential impacts of this proposed development at such an early stage. Canopy cover is important now but will only increase in importance as changes in the climate become more apparent.

Judy Fakes B.Sc.Agr; Dip.Ed; Grad. Cert. Forestry
Consulting Arborist
THE TREE SCHOOL
31st May 2007

# APPENDIX 1: SURVEY SITE

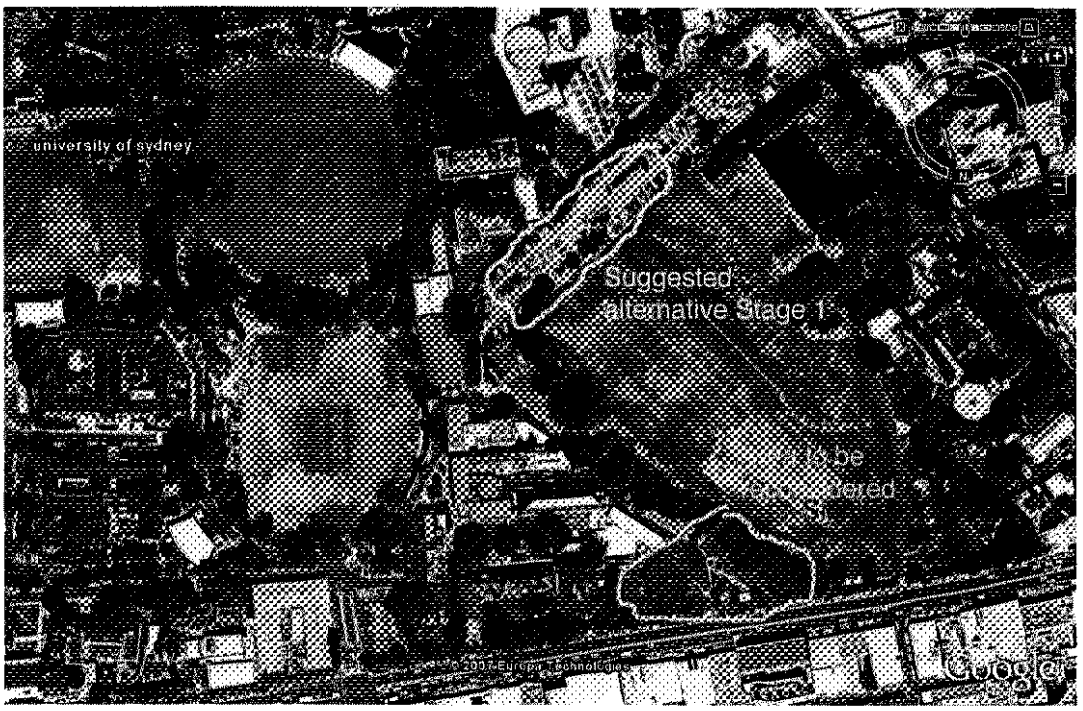



Masterplan concept plan: provided by JLL showing the proposed stages.




Study site . Aerial photograph provided by JLL

# APPENDIX 2: STAGING & DEVELOPMENT OPTIONS




**Yellow** **= alternative site for stage 1**

**Red** **= significant trees**

**Blue** **= area to be reconsidered and protected from development**

# APPENDIX 3: GENERAL TREE PROTECTION GUIDELINES

## 1.0 GENERAL CONDITIONS

The following conditions will apply to all trees likely to be affected by the proposed works associated with the Sydney University ARC project.

### 1.1 Pre-development planning stage

1.1.1 A suitably qualified and experienced arborist (minimum AQF level 5 qualification in arboriculture) shall be engaged to be a member of the planning team to advise architects, project managers, engineers, and landscape architects on design and construction issues that may impact on existing or future trees.

1.1.2 Once the design details have been developed, the arborist is to develop a detailed tree protection plan and specifications that are to be incorporated into the project documentation.

1.1.3 The arborist shall work with the landscape architect in developing tree supply, installation and maintenance specifications.

### 1.2 Construction stage (including demolition and landscaping)

1.2.1 A suitably qualified and experienced arborist (minimum AQF level 5 qualification in arboriculture) shall be engaged to supervise all works specified in the sections to follow. Experience must include establishment of tree protection measures, supervision of or experience in pruning of amenity trees and supervisory work on development sites.

The Arborist is to be given at least 24 hours notice to be on site if any works are likely to damage any part of any of the trees. Should any damage occur, the arborist is to be notified immediately. The arborist may need to be on site on a daily basis or less frequently but regularly.

A schedule of trees should be produced and records of inspection kept for each tree on each visit. Any damage or necessary treatments can be systematically recorded. Relevant photographs should be attached. The arborist should notify the project manager or site supervisor should there be a breach of the tree protection conditions.

1.2.2 All pruning must comply with AS4373 (2007) *Pruning of Amenity Trees.*

1.2.3. All personnel on site are to be made aware of their responsibility to protect trees and to observe the protection measures.

1.2.4 All tree protection zones are to be delineated with a 1.8 m steel mesh fence secured by concrete blocks and covered in shade cloth. Signs are to be placed on each side and or at 10m intervals to indicate that this is a tree protection zone. There is to be no access to this zone unless under the direct supervision of the supervising arborist. The tree protection measures are to be regularly inspected and maintained. The following activities or changes are generally prohibited within the tree protection zone:

- changes in soil level,
- trenching,
- storage of materials,
- disposal of solid or liquid building waste, solvents etc,
- parking of vehicles,
- installation of site sheds and
- any unauthorised access
-

1.2.5 Apart from trenching, any excavation close to or within the protection zone of the tree must be supervised by the arborist. All roots must be cleanly cut. Any cutting of the roots will lead to temporary and or permanent loss of vigour and so the size and position of the roots targeted for removal should be investigated by hand digging before any machinery is used. If no roots larger than 50 mm are located, the edge of the area to be excavated or trenched can be cut with a chain digger or by hand to provide a clean edge for further excavation using a back hoe or excavator. (NB. These implements are not to be used for initial excavation as they tear roots).
Exposed roots greater than or equal to 30 mm must be clean cut by hand.

1.2.6 Prior to the commencement of landscape works, the arborist shall supervise the removal of tree protection measures and supervise landscape works that may occur within the former tree protection zones.

1.2.7 The arborist shall work with the landscape supervisor to ensure that trees are supplied, installed and maintained as specified.

## 1.3 Post – construction

1.3.8 The arborist is to inspect the retained and new trees at intervals of 3 months, 6 months, 12 months, 24 months post-construction and provide a written report to the landscape manager.