ARBORIST'S REPORT

TREES – POTENTIAL REDEVELOPMENT SITE

ABERCROMBIE ST – DARLINGTON RD – CODRINGTON ST – GOLDEN GROVE ST

DARLINGTON CAMPUS
UNIVERSITY OF SYDNEY

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1.O INTRODUCTION

This report has been Jointly commissioned by Leon Carroll of Jones Lang Lasalle, Joe Agius, Director, Cox Richardson and Peter McGeorge, Assistant Director, Campus Planning and Development, University of Sydney with respect to the potential impact on trees of a proposed redevelopment of the Abercrombie Precinct of the Darlington Campus of the University of Sydney.

The area to which this report applies is that bounded by Abercrombie Street, Codrington Street, Darlington Road and Golden Grove Street and excludes the area occupied by Darlington Public School. It includes Rose Street, Darlington Lane and Boundary Lane.

This report expands on the Arborist's Report commissioned by JLL and produced in October 2007. That report, referred to as the October Report, is appended to this report.

In addition to the trees covered in the October Report, this report considers the street trees (in all except Golden Grove Road) and the vegetation in the rear gardens of the terrace houses in Darlington Road. The street trees are an important consideration as they are owned and managed by the City of Sydney. The City will have an opinion on any changes to the species selection and it may require protection of the trees should development occur.

The aims of this report are to:

- Identify trees and other vegetation that should be retained;
- Identify trees that may be transplanted; and
- Suggest species that may be used in landscaping associated with the re-development of this site.

The site was visited in December 2007 in the company of Joe Agius, Peter McGeorge and Mark Moeller, Grounds Manager, University of Sydney. The trees were inspected on 3rd January 2008. The trees were visually assessed for their general health, structural condition, useful life expectancy and their overall significance in the landscape. The worthiness of retention of the trees is based on a subjective but informed analysis of the longevity of the species, its ease of replacement, impact in the landscape, health and condition. The trees at the rear of the Darlington Road terraces were viewed from Darlington Lane and a detailed inspection of tree structure was not possible.

2.0 OBSERVATIONS

2.1 Darlington Road

The street trees in Darlington Road, as with the majority of street trees in this precinct, are managed by the City of Sydney. The most mature of the trees are *Populus deltoides* (Cottonwood) that range in condition from poor and declining to average (Figure 1). This is a deciduous tree. Most of the 7 Cottonwoods on the northern side of the street have considerable dead wood and appear to have damaged and decayed roots and butts probably as a result of replacement of the pavement. The 10 Cottonwoods on the southern side of the road have had similar root damage and have been pruned to accommodate overhead powerlines (Figure 2). Apart from two spans at the eastern end of Darlington Road and one span at the western end that have been converted to Aerial Bundled Cable (ABC), the remaining spans consist of two runs of open-wire construction low voltage powerlines. Depending on the construction, the side clearance required by Energy Australia ranges from of a radius 0.5m for ABC and 1.5 m for open-wire construction. Hence the impact on the trees ranges considerably.

Figure 1: Declining Cottonwood

Figure 2: Southern side of Darlington Rd showing pruning and replacement trees

According to Karen Sweeney, City Arborist (Pers. Comm.), the City of Sydney is gradually replacing these trees with *Liriodendron tulipifera* (Tulip Tree), the designated species on the City's Street Tree Masterplan[1]. The replacement Tulip Trees range in condition from dead to healthy with the majority of trees in good condition. To the traffic-control device opposite Golden Grove Street, there are 12 living Tulip Trees on the northern side of Darlington Road and 7 on the southern side. There is a new Eucalypt (possibly *Eucalyptus sideroxylon* – Mugga Ironbark) at the south-eastern corner of Darlington Road. This tree has numerous bark inclusions and is thus structurally defective.

Liriodendron tulipifera is a deciduous trees to about 20 m under local conditions with a single trunk and a conical habit. The flowers are yellow-green and with a tulip shape. It will be interesting to see how this species performs in such a built and paved environment. The choice of this species as a replacement for the poplars is likely to be based on retaining the character of the street with its deciduous trees, providing winter sun and summer shade to the terraces and by using a species that may have a less-vigorous root system.

Many of the front gardens of the terrace houses on the southern side of Darlington Road have been planted with *Plumeria rubra* (Frangipani). This has been carried out by the University. Some front gardens have small-growing native trees and shrubs including Bottlebrush, Banksia and Lillypilly.

2.1.1 Recommendations

- Retain the Tulip trees as street trees and review their performance in 5 years.
- Continue to plant Frangipani in the front gardens of the terrace houses

2.2 Darlington Lane

Neither Darlington or Boundary lanes appear on the City of Sydney Street Tree Masterplan. The southern side of the lane alongside the new Economics and Business Building has been planted with alternating *Populus sp* (Poplar) and Frangipani. Both of these trees are deciduous. The poplars will provide summer shade and winter sun to the building and are tall enough to be providing scale to the building. The Frangipani are reminiscent of the residential history of the site. They provide fragrant and showy flowers throughout summer. The poplars will require some crown-lifting to allow for the healthy growth of the Frangipani.

[1] The City of Sydney Street Tree Masterplan is an adopted policy and the details are available on http://www.cityofsydney.nsw.gov.au/Environment/TreeManagement/StreetTreeMasterplan.asp

It was suggested at the initial site visit in December 2007 that the rear of the terrace houses may be developed into student housing with Darlington Lane being opened up as a pedestrian precinct.

Not all rear yards have trees or shrubs. The vegetation behind properties from the Codrington Road end to 98 Darlington Road is of low retention value.

There is a significant group of mature, established trees with a long useful life expectancy at the rear of properties 99-101 Darlington Road. These properties have no dividing fences. The group includes a Mango, Lillypilly and Blueberry Ash *(Eleocarpus reticulatus*) (Figure 3). At the rear of 102-103 is a mature *Eucalyptus saligna* (Sydney Blue Gum) in excellent health and condition. This tree has a long useful life expectancy (Figure 4). At the rear of 105 is a group of Lillypillies (*Acmena smithii* (Figure 5). This group has a high retention value. This group is opposite the western end of the Economics and Business Building.

Figure 3: Trees at the rear of 99-101 Darlington Road – from Darlington Lane

Figure 4: Sydney Blue Gum at the rear of 102-103 Darlington Road

Figure 5: Trees at the rear of 105 Darlington Road. The Sydney Blue Gum is to the right.

Vegetation at the rear of 108, 109, 100, 112 and 114 is a range of small trees and shrubs of no exceptional merit and are generally species that are easily replaced and thus have a low retention value.

There is a mature *Quercus ilex* (Holm Oak) at the rear of 116 Darlington Road (Figure 6). This is a very slow-growing, evergreen tree and it is likely that this tree dates from the early years of the development of this site. It is in good condition and should be retained as it still has a long useful life expectancy. Retention of this tree will also require quarantining the yard of 117. A *Robinia pseudoacacia* 'Frisia' (Golden Robinia) is located nearby at the rear of 118. While this tree is in good condition, it is of a lower priority for retention that the Holm Oak.

Figure 6: A mature Holm Oak behind 116 Darlington Road. This tree is of high retention value as it is likely to be the oldest remaining tree in this precinct.

The vegetation behind properties 128-131 is of low retention value.

On the southern side of Darlington Lane, adjacent to the recycling centre are 3 *Fraxinus sp.* (Ash). They are in good health and condition and an argument could be made to transplant these trees. However, the cost-effectiveness of this would have to be determined and it is likely that the cost and difficulties of transplanting these trees would exceed their value.

At the western end of the Economics and Business Building is a row of *Betula sp.* (Birch). These are attractive young trees at the moment but should not be considered an impediment to development. They are a relatively short-lived tree in Sydney and there would be no value in transplanting them.

The only other tree in the lane is a *Melaleuca quinquenervia* (Broad-leafed Paperbark) on the western corner of the storage area. This tree has a low retention value as it is easily replaced and it is well-represented elsewhere on campus.

Should development of the University Garage and associated car park occur, then the Eucalypts around the perimeter of the play ground of Darlington Public School will need adequate protection. These are healthy trees that would provide considerable shade and amenity to the school (Figure 7). While the root zone of the trees would be protected if the current brick wall defined the building foot print, the foliage overhangs the car park by about 4 m. Building works would threaten the canopy of these trees.

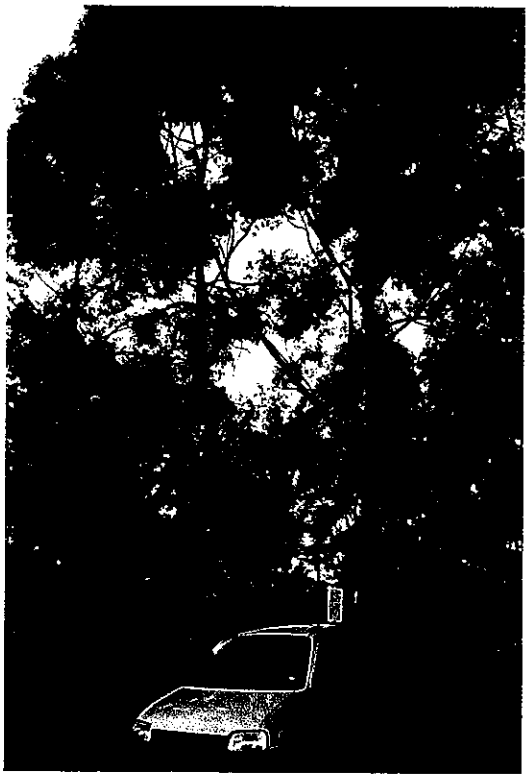

Figure 7: Some of the trees around the perimeter of the playground of Darlington Public School that will require substantial set-backs should development occur in this area.

2.2.1 Recommendations

- Retain the plantings of Poplars and Frangipani along the northern side of the Economics and Business Building.
- Retain the trees in the rear yards of 99-105 Darlington Road and turn this into communal open space. No changes in grade should occur.
- Retain the Holm Oak at the rear of 116 and incorporate the rear of 117 into another area of open space. As above, no changes in grade are to occur.
- Allow adequate setbacks to any development in the vicinity of the trees in the grounds of Darlington Public School. These setbacks must protect both the roots and the canopies of these trees.

2.3 Abercrombie Street

Only the trees on the northern side of Abercrombie Street from the Childcare Centre to Codrington Street were considered. The majority of the street trees are mature *Liquidambar styraciflua* (Liquidambar or Sweetgum). These are in variable form and condition with some in very good health and condition. There is one *Lophostemon confertus* (Brush Box) in poor health outside the front entrance of Mandelbaum House.

According to the City of Sydney Street Tree Masterplan, the replacement species for Abercrombie Street is *Nyssa sylvatica* (Tupelo). This is a deciduous tree that will allow solar access in winter for the properties in the street. Abercrombie Street is relatively wide and should be able to accommodate the spread of this tree. At this stage, there is only one of these planted in this section of Abercrombie Street.

In the grounds of the childcare centre are several trees including *Eucalyptus scoparia,* one *Lophostemon confertus* (Brush Box) and a *Gleditsia cv.* None of these trees is in excellent condition or would be considered significant. Similarly there are a number of Eucalypts and other small native trees/ large shrubs between university buildings and the boundary fence along Abercrombie Street that are of low retention value and are easily replaced.

The only vegetation worthy of retention in the block bounded by Darlington Public School, Abercrombie Street, Codrington Street and Boundary Lane are a row of 5 *Flindersia australis* (Crow's Ash) (Figure 8). These semi-mature trees are located at the eastern end of the Shepherd Centre, between Mandelbaum House. They are in good health and condition. If there are no level changes planned for the area they could be retained and protected in situ. If level changes or construction will come within 3 m of these trees, they should be transplanted, stored for re-use in this precinct or planted elsewhere on campus. They are

along-lived and majestic tree. They are probably planted too close together to reach their full potential.

Figure 8: A row of 5 Crow's Ash that should be retained or relocated.

2.3.1 Recommendations

- Retain or relocate the 5 Flindersia between The Shepherd Centre and Mandelbaum House. The action is dependent on level changes.

2.4 Boundary Lane

The most significant tree in Boundary Lane is the *Corymbia citriodora* (Lemon-scented Gum) adjacent to the computing centre. This tree is comprehensively discussed in the October Report, Appendix 1. Despite the good health and condition of this tree, its proximity to buildings and services would make its retention impractical.

2.5 Rose Street

On the southern side in the foot path are six recently planted *Eleocarpus reticulatus* (Blueberry Ash). On the other side of the road is a row of *Flindersia*

australis (Crow's Ash/ Australian Teak). These have probably been planted in the last 5-10 years and are in excellent condition. The Flindersia should be retained as it is quite difficult to procure good examples of this species and this particular row is in excellent condition. It may be possible to transplant them but the preferred option would be to retain them in their current location with no changes in their root zone. Blueberry Ash is the species listed on the City of Sydney Tree Masterplan for Rose Street. They could be retained or relocated but replacement of this species is not difficult as they are readily available.

Between building H05, the Joiner's Shop, and the Clark Building Book Repository is a double row of mature/semi-mature *Casuarina* spp. These are in average condition and are not considered significant. Similarly, there are six mature Broad-leaved Paperbarks outside the Clark Building These are healthy but show the typical structural defect of included bark.

The most significant tree in the entire precinct is the *Eucalyptus saligna* (Sydney Blue Gum) located at the eastern end of the block bounded by Rose Street, Codrington Road and Boundary Lane. This tree is comprehensively discussed in the October Report (Appendix 1). This tree has a very high retention value and every effort should be made to retain it.

2.5.1 Recommendations

- Retain the *Flindersia australis* on the northern side of Rose Street.
- The Sydney Blue Gum is the most significant tree in the Abercrombie Precinct. It is healthy, vigorous, structurally sound and visually dominant. It is unlikely that the City of Sydney would approve its removal. Should the area be re-developed, every effort should be made to retain this tree and to facilitate its long-term health. In order to ensure this, it must be seen as a constraint in the design process and must be considered at every stage of the development, including final landscaping. There must be no excavation beneath this tree. The recommended tree protection zone is a radius of 12 m from the base of the tree in all directions.

2.6 Codrington Road

There are two *Liquidambar styraciflua* (Liquidambar) street trees adjacent to the small park at the eastern end of Abercrombie Street and Codrington Street. They are beneath powerlines and are in poor form due to pruning. They also show signs of root damage. There is another large Liquidambar across the road in front of the Services Centre. This tree has a major bark inclusion between its two co-dominant stems. According to the City of Sydney Street Tree Masterplan, these trees are to be replaced with *Eucalyptus sideroxylon* (Mugga Ironbark). This Ironbark has attractive black, furrowed bark, grey foliage and pink flowers.

However, it is also prone to the condition of included bark – a structural defect that can lead to failure. If this species is selected, care must be taken to select quality stock and to formatively prune the trees.

To the north of the Liquidambars are several *Harpullia pendula* (Tulipwood). These have been planted by the University and older plantings at the northern end of Codrington Street have performed well. This is a native to the eastern Australian coastal rainforests and would be more shade-tolerant than the Ironbarks.

There is a small park on the corner of Coddrington and Abercrombie Streets and bounded by Boundary Lane. This park contains approximately 15 trees and a number of shrubs (Figure 6). The trees include mature specimens of *Melaleuca quinquenervia* (Broad-leaved Paperbark), *Melaleuca bracteata*, *Tristaniopsis laurina* (Water Gum), *Lagunaria patersonii* (Norfolk Island Hibiscus), *Callistemon* spp. (Bottlebrush), one *Cupressus sempervirens 'Stricta'* (Pencil Pine), one Frangipani and a *Glochidion ferdinandii* (Cheese Tree). In the 2001 tree survey, only the Cheese Tree rated any special mention for its botanical value.

The trees range in condition from very good to very poor. They are all mature and probably gate from the 1970s/80s.

2.6.1 Recommendations

- Retain (but formatively prune) the *Harpullia pendula* and use as the street tree for Codrington Road.

3.0 SPECIES SELECTION

The choice of species will largely depend on the need for winter sun and the degree of shading that will be produced by the buildings. Tables 1 & 2 list potential species.

Apart from the two Sydney Blue Gums that are recommended for retention, the planting of new Eucalypts is not recommended as they are generally quite shade-intolerant as a group. The following trees are suggested as possibilities for the new landscape. They are generally readily available.

3.0.1 Recommendations

- The Landscape Architect should liaise with the Consulting Arborist during the drafting/ planning of the landscape for the development.

- Once the species are selected, they should be contract grown to comply with the criteria listed in Clark (2003)[2]

Table 1: Deciduous trees

Ginkgo biloba	Ginkgo/ Maidenhair Tree	Narrow/medium dome to 20 m; butter-yellow leaves in autumn; lovely tree
Jacaranda mimosifolia	Jacaranda	Purple flowers; dome-shape to 20m; good shade tree
Koelreuteria paniculata	Golden Rain Tree	Dome-shaped tree to 10m; yellow flowers in summer; small shade tree
Lagerstroemia speciosa	Queen Crape Myrtle	Dome shape to 10 m high and wide; lovely bark, larger flowers than regular Crape Myrtle
Plumeria rubra	Frangipani	Fragrant flowers in summer; residential areas
Pyrus calleryana cvs	Callery Pear	Great autumn colour; to about 12-15m; white flowers in early spring; good shade; care to get stock without included bark;

[2] Clark, R. (2003) *Specifying Trees: A Guide to Assessment of Tree Quality.* 2nd Edition. Natspec Guide; Construction Information Systems, Australia, Milsons Point.

Table 2: Evergreen trees

Botanical name	Common Name	Characteristics/ suggested use
*Backhousia citriodora**	Lemon Myrtle	Lemon-scented leaves; balls of white flowers in summer; erect habit to 15m; good screen
*Banksia integrifolia**	Coastal Banksia	Erect tree to 10 m, bird-attracting; backyard; sun
*Brachychiton discolor**	Queensland Lace Bark	Mostly evergreen to 10-15 m, conical crown, handsome tree; small bell-shaped pink flowers; good shade tree;
Calodendrum capense	Cape Chestnut	Generally evergreen/ partially deciduous; to 10 m, glossy green leaves; showy pale-pink flowers; small shade tree may be hard to locate quality stock
*Castanospermum australe**	Queensland Black Bean	Broad-domed to 15 m; orange-red pea-shaped flowers; large woody fruits; great bird tree; do not plant in paved areas due to fruit
*Flindersia australis**	Crow's Ash	Variably deciduous but mostly evergreen; narrow dome to 20 m; interesting fruits; large shade tree
*Harpullia pendula**	Tulipwood	Conical crown to 10 m; interesting flowers and fruit; good shade tree
*Lophostemon confertus**	Brush Box	Medium dome to 15-20 m; white flowers in late spring; good shade tree
Magnolia grandiflora	Bull Bay Magnolia	Large glossy green leaves and large white slightly fragrant flowers in summer; to 15 m tall; spreading; good shade tree

* Native to Australia

4.0 SUMMARY OF RECOMMENDATIONS AND CONCLUSIONS

Overall, there are few trees that are of high retention value. Those that should be retained and protected are:

- The large Sydney Blue Gum on Codrington Road near Rose Street
- Retain the *Flindersia australis* on the northern side of Rose Street.
- The plantings of Poplars and Frangipani along the northern side of the Economics and Business Building.
- The trees in the rear yards of 99-105 Darlington Road and turn this into communal open space. No changes in grade should occur.
- The Holm Oak at the rear of 116 and incorporate the rear of 117 into another area of open space. As above, no changes in grade are to occur.
- Allow adequate setbacks to any development in the vicinity of the trees in the grounds of Darlington Public School. These setbacks must protect both the roots and the canopies of these trees.

There are few trees that are worthy of transplanting apart from the row of 5 *Flindersia australis* between the Shepherd Centre and Mandelbaum House.

In terms of existing planting themes, the Flindersia have worked well as street trees in Rose Street. Similarly, the *Hapullia pendula* in Codrington Road have generally been successful. The University's policy of planting Frangipani in the front gardens of the terrace houses in Darlington Road is also commendable.

Clearly there will have to be negotiation with the City of Sydney if any of the streets that they currently manage are to developed. Any changes to the Street Tree Masterplan will also have to be negotiated. Similarly, any development near the City's trees is likely to require the protection or the replacement of the street trees.

Given that this report has been commissioned early in the planning stage of this development, it is hoped that there will be ongoing arboricultural input as the only stage at which trees can be successfully retained (for the long term) is at the planning stage.

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