

Gore Hill Park
Landscape and Recreation Masterplan

ISSUES REPORT

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1 Methodology

Data collection for tree assessments was obtained during three specific site visits. Other general observations relating to trees and ground-truthing of some of the findings of the tree assessments were made during site visits for other purposes.

The basis of data collection relating to hazards and retention worthiness of trees was the visual tree assessment (VTA) approach adopted by the arboricultural industry in Australia based on the work of overseas authors (Matheny & Clarke, 1994; Barrell, 2001; Mattheck & Breloer, 1993; Pokorny, 2003). This involves a visual assessment of the tree from ground level. No probing or mechanical investigations were conducted.

A comprehensive risk assessment of each individual tree was not conducted, rather a “walk-by” approach in which observations of readily identifiable structural and health indicators in the trees were made without further investigations being conducted. The intent was to develop an overview of the current level of risk from trees in the park and provide an understanding of the constraints and opportunities associated with them that would help with the development of the masterplan.

Recommendations for the retention or removal of trees were based on the range of values they contribute to the site. The values can be categorised under the themes of “ecology, community and delight” on the basis of their natural heritage and functioning (ecology), cultural heritage and role in the park (community) and special qualities and locations of trees that contribute to the amenity of the park (delight). The merits of older trees in terms of special qualities is identified by authors such as Pakenham (2002).

2 Overview

Gore Hill Park has some excellent tree assets located around the perimeter areas of the park (figure 1).

There is excellent gradation of age classes, from juvenile to senescent (see Map 1: Tree Age Class). This means the tree assets can continue to benefit the park in the foreseeable future. As old trees decline and die, a succession of replacement trees is in place to replace losses.



Figure 1: Tree plantings in the perimeter areas of Gore Hill Park. Left: trees along the Reserve Road edge. Right: trees at the western edge of the oval.

It is not clear that planting of trees since the park was established followed any formal plan prior to the adoption of the Plan of Management (WCC, 1996). They are of varied provenance (see section 4 and Map 2: Tree Provenance) and are planted as (i) individual specimens (figure 2); (ii) in small clumps (figure 3); or (iii) in dense stands (figure 4).

More recent plantings are of species from the site's pre-European vegetation community (Blue Gum High Forest) (figures 3 and 4). These plantings will contribute excellent values to the park as they mature, both in supporting the ecological values of the remnant vegetation on the site and in improving the environment and amenity of the park.

The usefulness of trees in contributing to circulation and creation of functional spaces in the park's perimeter has not always been well-exploited (figure 5). However, because regular planting of trees has occurred in the past, selective culling of some of the plantings would not reduce their overall amenity.



Figure 2: Plantings of individual specimen trees in Gore Hill Park near the Pacific Highway frontage.



Figure 3: Group plantings of Blue Gum High Forest species on the southern berm overlooking the oval.



Figure 4: Dense tree plantings on the cut above the northern end of the oval.



Figure 5: Informal paths amongst trees on top of the southern berm of the oval.

Trees occur in a variety of situations including:

1. Islands in asphalt carparks
 2. Garden beds
 3. Grassed areas
 4. Embankments created by cutting
 5. Grassed earthberms created by fill from cuts or other sources
1. The trees in islands in asphalt carparks are remnant old Turpentine (*Syncarpia glomulifera*) that appear water stressed. This was probably brought on by the recent summer heat being amplified in areas covered with and surrounded by hot asphalt. The old trees already subjected to other physical stresses in their environment may have been less able to cope than those whose roots had cooler soil conditions. The stressed trees are downslope of a cluster of dead vegetation, including an old Turpentine and it is therefore also possible that something in the soil may have killed the other vegetation and be moving downslope and affecting them.
 2. The performance of plantings in garden areas is varied and appears to relate to species, the size of the garden area, and/or the environment.

The two garden beds at the corner of Reserve Road and Pacific Highway contain mixed plantings of conifers and a variety of Australian species, including some that are locally indigenous. The conifers in these gardens appear to have suffered badly during the recent

extreme temperatures of summer and many have died or been damaged.

A few deaths of trees indigenous to Sydney have occurred in two of the garden beds in carpark areas. However, in the areas adjoining carparks where substantial continuous garden beds are available, trees appeared less stressed than those in the islands in the asphalt.

3. Throughout the grassed areas of the perimeter of the park, trees have been planted as individual specimens. It is noticeable that in general, when planted in lawn environments the exotic specimens have performed much more poorly than the Australian species.
4. The embankment created by cutting at the northern end of the oval has been mass planted with indigenous trees (figure 4). Establishment of individual trees in this area has been poor and gaps in the plantings suggest losses. This is probably due in large part to the soil conditions where it appears that the B horizon below the topsoil was exposed by the cut and trees were planted directly into it. This is borne out by the better performance of the trees at the western end of this planting where the grade suggests that topsoil from the A horizon was still present for the planting. If mulch was applied at the time of planting, it may have washed off due to the steepness of the slope. The soil is hard and lacks organic matter.

The close spacing of the plantings will have contributed to stunting and poor development of many specimens. Even at the western end of the cut, where performance is better, there are many stunted specimens that have not competed well.

5. The older trees in the earthberm are individual specimens in grass (figure 5). They include a few remnant specimens that have coped well with the disturbances that would have occurred when the earthberm was constructed. Recent plantings into the earthberm have been of groups of between about three and five specimens into garden bed conditions that are mulched and kept free of grass. Trees in clumps in garden beds generally appear more vigorous or are coping better than the relatively recent plantings of individual specimens into the cutting or into lawn in other places in the park. This could be due to a combination of factors, including:
 - Better initial site preparation
 - Better soil conditions due to mulching, ameliorated compaction and improved aeration, rainwater infiltration and drainage
 - Lack of competition from grass

- Biodiversity improving soil ecology for root functioning
- Species selection

No signs of problems related to pests and diseases were noted. As discussed above, a few tree deaths may be due to insect pests in the soil, but this was not investigated.

3 Ecological Values

3.1 Remnant vegetation

The site contains a good number of old trees that are remnants of the Blue Gum High Forest of the north shore and northern suburbs of Sydney that once covered the site (Benson & Howell, 1990) (the large specimens in figure 1). This vegetation is listed under the NSW Threatened Species Act (1995) as an endangered ecological community (NPWS, 1997). About 1% of the original area of the community currently exists in the form of a number of remnants and the Scientific Committee considers the Blue Gum High Forest community likely to become extinct unless threats to its survival are eliminated. Threats include “fragmentation, developments, increased nutrient status, inappropriate fire regimes, invasion by exotic plants, mowing and clearing”. On this site, all these threats are present.

The remnant trees on this site are all of a similar age-class: mature and old but not yet senescent. No seedlings or young self-sown trees were noted and only a very few understorey species associated with this community were present in the park (note: a flora survey was not conducted).

3.2 Habitat values

Many of the remnant trees contain hollows, including some very large ones. Due to their height and branch girth, they provide excellent perching sites for large fauna, including birds. Most of them are actively flowering or fruiting, or have recently done so. During site visits, several different species of indigenous birds, as well as signs of mammal activity (scratch marks and bark damage consistent with feeding) were observed.

Most of the plantings of species from the Blue Gum High Forest community are still immature and not yet contributing their full ecological benefits, but their contribution will steadily increase and improve.

Some specimens of the non-local species provide good perching sites and possibly food sources to native fauna, but in general they cannot be considered useful contributors to the natural heritage of the site; rather they detract from it.

3.3 Weeds

Herbaceous and woody weeds are present in parts of the landscape (figure 6). In particular, weeds are abundant along the interface with the cemetery and in the western portions of the site where topsoil is still present. Management practices adopted by the Gore Hill Memorial Cemetery Trust contribute substantially to this situation. The Trust has opted to keep some of the vegetation in the cemetery relatively unmanaged, in part to maintain the character of the place and in part due to lack of resources (MUSEcape, 1996). Aside from old plantings and invasive weeds, the cemetery contains remnant indigenous species, including shrubs, grasses, ground covers, climbers and herbaceous plants that would be threatened by mowing and some weed control practices.

4 Ages of Trees

Ages of the trees range from senescent to juvenile (see Map 1: Tree Age Class). The range occurs mostly in the planted specimens that include a few old figs along Reserve Road that are senescent (due to age and/or difficult site conditions) and recent plantings that still contain juveniles.

The remnant trees are survivors of the site's pre-European Blue Gum High Forest vegetation community and are generally of the one age class: very old. In a few cases they appear to be nearly senescent but this may well be overcome by special management. A few mature remnant trees in the understorey may be younger, self-sown specimens.



Figure 6: Weed invasion in the north-western corner of the park adjacent to the cemetery and the hospital grounds.

5 Provenance of plantings

The trees in the park include specimens that are (see Map 2: Tree Provenance):

1. Remnant (locally indigenous) or
2. Planted (source of stock not determined) or self-sown, including:
 - i. species from the Blue Gum High Forest community
 - ii. species from the Sydney bioregion
 - iii. other Australian species (natives)
 - iv. exotic species
 - v. weeds

The remnant vegetation on the site consists predominantly of large, overstorey trees. However, it includes some smaller mature understorey trees. They are most likely “successional recruits” that have been able to establish on the site due to the absence of fire and are representatives of the successional vegetation community that would naturally replace the fire-dependent community under such conditions. These specimens may be self-sown from seed deposited on the site by fauna such as birds or bats.

Older plantings include an eclectic variety of Australian and exotic species. In some cases, mature specimens may be self-sown. The older plantings occur in all but the northern carpark areas, with many in the western and eastern sections. A few old ornamental indigenous figs (*Ficus* spp.) were planted at the entry to Reserve Road. At the entry to the park on the corner of Pacific Highway and Reserve Road are two kidney shaped beds of conifers and other exotic species. A letter relating to these plantings from the Friends of Willoughby (Piatti, 1996) was found as part of the historical research. It requested that the trees be protected from destruction and that any losses be made good with the same species on the grounds that they provide “bio-diversity, screening of noise and pollution, shelter and shade, filtering of carbon monoxide, shelter and home for native fauna” and “peaceful amenity”. While these trees do provide a certain degree of screening in our opinion they do not fulfil any of the other functions stated. In addition they obstruct visual access to the park from St Leonards.

More recent plantings appear to be locally indigenous in the northern and southern sections overlooking the oval. In contrast, exotic plantings are predominant in the western area and along Pacific Highway frontage. The Plan of Management for the park (WCC, 1996) recommends plantings of indigenous species as well as deciduous trees.

6 Risk Management of Trees

Risk management of the trees in the park is an important consideration in the development of the masterplan (see Map 3: Tree Risk Plan). At present, carparks, paths and built structures are located amongst trees. Seating is provided under many trees and is well-used. The area at the north-western edge of the oval contains several large remnant trees and, although it lacks seating, appears to be a popular place for sitting on the grass in the shade of the trees.

Most of the existing risk management issues are associated either with (i) poor arboricultural management practices related to utilities; (ii) aging large trees; (iii) carpark plantings; or (iv) dead trees. Future problems are likely to arise as tree plantings mature in carparks.

6.1 Trees under wires

Street trees along the Pacific Highway adjoining the park have been heavily and badly lopped for clearance under overhead electricity wires (figure 7). This has created a serious risk management problem with regard to these trees. Some of them are in an extremely hazardous condition and since they overhang a public footpath that is well-used, the risks are relatively high. (Note: The tree roots are not lifting the pavement.)

6.2 Old trees

The park contains some very old trees, most of them remnant specimens. In addition to other contributing factors, natural senescence is occurring in these old trees and the large limbs that are dying back are prone to failure. Furthermore, many of the old trees have significant structural problems associated with large cavities and large wounds from previous failures of major stems. In most cases they present a serious hazard to any targets in the risk zone. Many of these trees are in areas adjoining roads, carparks and pedestrian routes. It was noted during all site visits that the seating under the large remnant trees is well-used.



Figure 7: A street tree (*Melaleuca quinquenervia*) under wires that has been badly damaged by lopping.

6.3 Carpark Plantings

Typical adverse impacts associated with vehicular activity in the vicinity of trees were noted (figures 8 and 9). Wounding to the lower stems and root crown was common in the upper carpark. In the case of a few of the older trees, there was old root damage that may be the result of construction impacts. The island plantings showed signs of probable water and/or heat stress.

6.4 Dead and Dying Trees

A few dead trees are scattered throughout the park. Only one of them, a large *Syncarpia glomulifera* (Turpentine), is a remnant specimen.

The cause of deaths was not investigated but may, at least in some of the cases, be due to the recent exceptionally hot weather affecting trees not yet fully recovered from the previous drought. Sudden deaths may be due to root-eating pests in the soil. Poisoning of weeds possibly occurred in the vicinity of the Turpentine and contributed to its death.

Some of the figs along Reserve Road are senescent; they may be dead within a few years.

Several exotic species have dead or severely stressed crowns, indicative of sunburn and heat stress. They are unlikely to fully recover from the damage.



Figure 8: The north-western carpark where trees occur in islands and cars park up against them.



Figure 9: A car parked against the base of a large remnant tree in the northern carpark.

7 Opportunities

7.1 Ecology: Remnant Vegetation and Habitat

This site offers a rare opportunity to retain and enhance a component of an endangered ecological community within an urban park. Aside from the natural heritage benefits this would bring, it would also give the park a stronger and distinctive identity making it recognisable as much more than a sportsground.

Propagation of trees for future plantings within the park could be from seed collected from the remnant trees, with the proviso that other sources of suitable seed also be used to avoid problems of in-breeding.

Willoughby Council's bushland management team could contribute to the management of the remnant forest and use harvested propagative material from other suitable sites in the municipality.

Most of the remnant trees are located in the western and northern portions of the park near its interface with Gore Hill Memorial Cemetery. This enables a management approach that exploits and integrates the ecological values of both the park and the cemetery in combination, with synergies of benefits.

Understorey plantings of species from the Blue Gum High Forest community could be established amongst the remnant trees. This would improve the biodiversity values of the site and contribute to the on-going

health and viability of the trees. It would also add an additional dimension to the plantings in the park.

Supporting this ecological community would offer an additional attraction in this park and the adjoining cemetery. Interpretation of the landscape would add to this and potentially make the park a small educational resource.

7.2 Ages of Trees

The abundance of trees in all age classes in the perimeter areas of the park makes decisions about removals relatively easy in most cases. Aside from some particularly significant trees, tree removals would be acceptable to accommodate improved design features, provided the masterplan is to maintain extensive perimeter tree plantings in the park. In particular, the dense plantings of trees that have not yet reached maturity could be selectively culled to improve the amenity of the remaining trees in those plantings.

The old mature trees contribute significantly to the amenity of the park and are almost all suitable for retention. The senescent fig near the entrance to the northern carpark is also worthy of retention. To achieve this, special management will be required, including the mulching and planting around their root zones and establishing exclusion zones to protect park visitors from hazards relating to potential failures of their parts. The special management of these existing trees would improve the value of their contribution to the park and to the wider area.

The approach of continued tree plantings that supports a range of age classes through time should be maintained. By building into a masterplan the role of tree plantings in the functioning of the park as public open space, future plantings could contribute even more constructively to the park.

7.3 Provenance of Trees

As discussed above, the opportunity exists to retain all the remnant trees.

Many of the mature native trees could be considered for longer retention, provided the ultimate goal was to replant with locally indigenous specimens once they had reached their "use-by" date. The less significant specimens (such as ones that are either small, not yet mature, hazardous, or of poor form) should be removed.

The opportunity exists to remove most, if not all of the exotic trees. Some of the mature specimens could be retained for their amenity values until replacements of local species are sufficiently established.

7.4 Risk Management

7.4.1 Trees under wires

The opportunity exists to put the overhead wires along Pacific Highway underground and to establish locally indigenous trees that define the boundary to the park, provide shade and shelter and mitigate the unpleasant highway-front environment.

Arguably, Council could require the persons responsible to make good the damage and the risk created by improper pruning not in accordance with the Australian Standard AS 4373-1996, "Pruning of Amenity Trees".

7.4.2 Old trees

The opportunity exists to retain the old trees. To achieve this, the areas under most of these trees should be established as exclusion zones to minimize risks to persons and property. Also, improved tree management would be necessary around the critical root zones of the trees. The root zones could be cleared of asphalt, debris and weeds, ameliorated and mulched. This would most likely improve the prognosis for most of these trees and result in a considerably longer safe life expectancy for them.

Seating opportunities beneath old trees would need to be carefully assessed and designed. Where seating is provided, the trees would need to be regularly monitored and cleared of any problematic deadwood¹.

7.4.3 Carpark Plantings

The opportunity exists to eliminate some of the carparks and establish soft landscapes that build on the existing tree plantings. Some of the trees planted along the borders of carparks could be culled. This would allow the trees that are performing better to have improved conditions for their on-going establishment. Culling could also be undertaken to allow plantings of smaller, non-woody plants that withstand minor impacts from vehicles better. Such plantings could be designed to give better definition to zones and access within the park.

8 Recommendations

See Map 4: Tree Action Plan.

¹ Removal of deadwood is an identified threatening process under the Threatened Species Act.

8.1 Remnant Trees

All the remnant trees in the park should be retained. This will require designing of the landscape spaces so that they can have dedicated zones that (i) allow their on-going health, vigour and structural integrity to be supported with suitable management practices and (ii) keep people and property away from the target zones should parts of the trees fail.

8.2 Planted Trees

All juvenile and semi-mature should exotics be removed in the short-term.

Mature exotics should be considered for immediate removal or removal in the medium-term term (five to ten years) as part of a tree management plan that improves the ecological values of the site. The intention should be to retain those exotic trees that provide substantial amenity or function within the park until suitable replacement specimens of locally indigenous provenance are well-established. Exotic trees that do not come into this category should be removed in the short-term.

Only one (tree no. 195 on the plans) of the few figs along Reserve Road is considered worthy of special management for retention. It should be retained within an exclusion zone. Note that at present several structures, a tap and an informal path are located within the root zone area.

The two groups of conifer plantings near the corner of Reserve Road and the Pacific Highway are recommended for removal subject to further community consultation.

8.3 Weeds

All weeds and potential weed species should be removed.

8.4 Street Trees on Pacific Highway

Remove all these trees and replant according to how the overhead wires are managed. If the wires cannot be relocated underground, consider small trees along the street and larger trees in the adjoining park area.

8.5 Dead Trees

None of the dead trees are considered worthy of retention for habitat values. They should be removed. It may be worthwhile undertaking soil or landscape analysis to try to identify the cause of death in order to prevent future problems with plantings in the same locations.

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