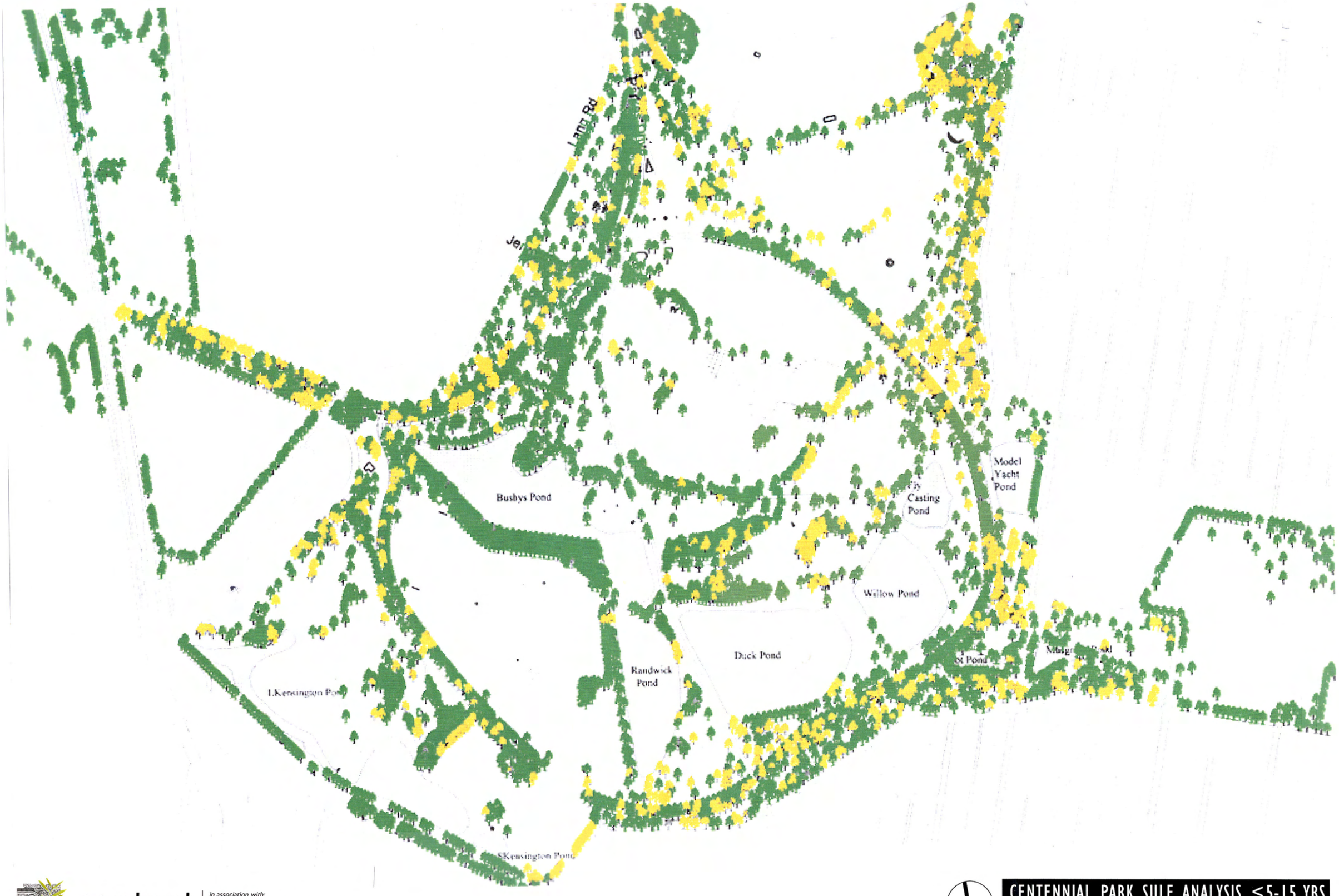

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in association with:
- Catherine Evans, Landscape Architect
- Tempe Macgowan, Landscape Architect
- David Beaver, Landscape Architect
- MUSEcape Pty Ltd
- Garry Clubley, Arborist

CENTENNIAL PARK SULE ANALYSIS <5-15 YRS

Drawing No: V 2.10

0 250 500m

Scale: 1:10,000 @A3 approx

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- David Beaver, Landscape Architect
- MUSEcape Pty Ltd
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GRAND DRIVE SULE ANALYSIS <15-40 YRS

Drawing No: V 2.11

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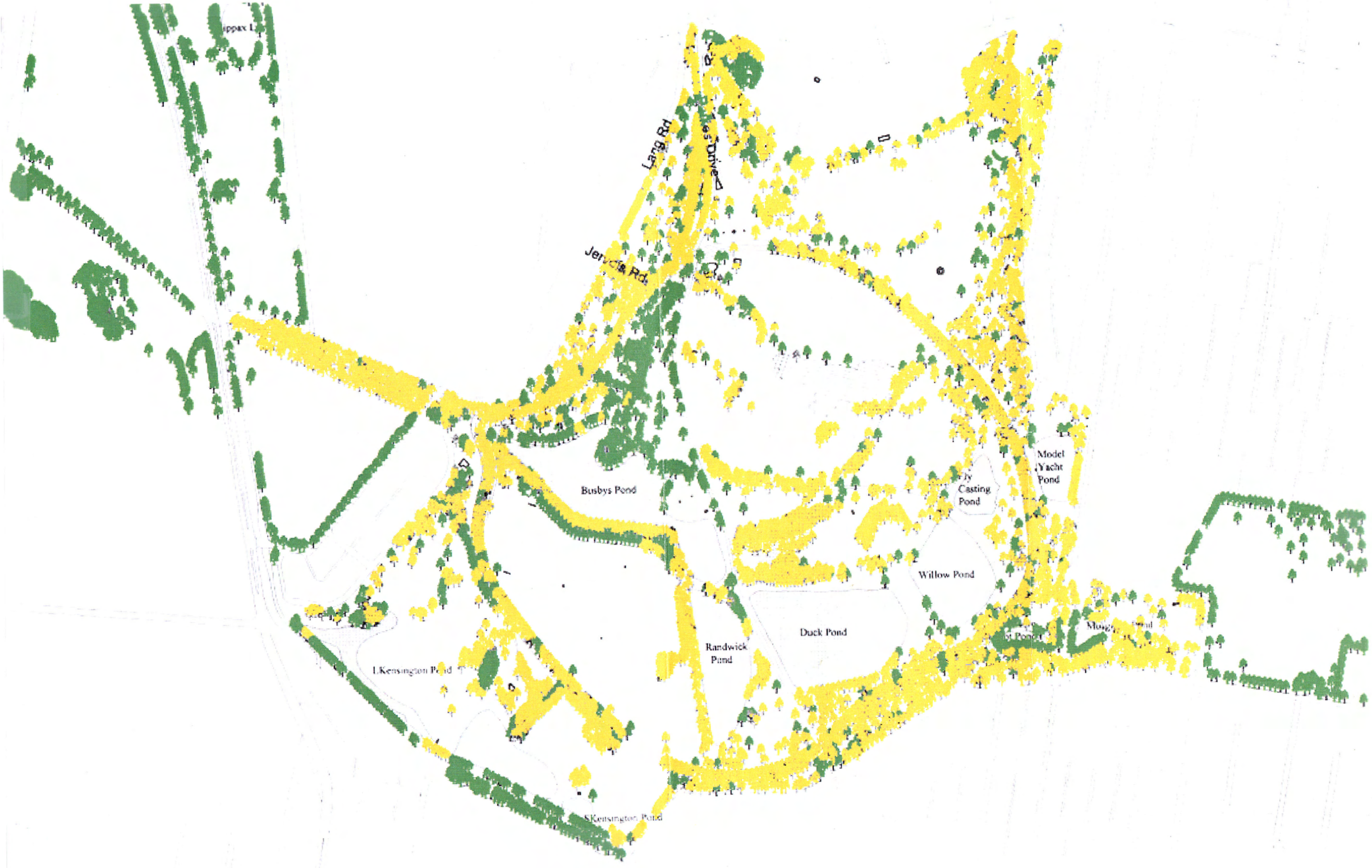
Scale: 1:10,000 @A3 approx



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CENTENNIAL PARK SULE ANALYSIS <15-40 YRS

Drawing No: V 2.12

0 250 500m

Scale: 1:10,000 @A3 approx

5.4 ANALYSIS OF ACTUAL TREE LOSS

In order to assess whether the anticipated decline of the tree population through out the Parklands is realistic, tree removal data sheets for the last 5 years were reviewed. This involved analysis of information collected by Parklands staff on 553 separate tree removal application sheets since 1993.

The aim of this approach was to determine if there were any patterns developing over recent years that would support the SULE predictions.

Looking at removals as a whole revealed that approximately 100 trees per year are removed across the Parklands. This is consistent with the figures for Wollahra Council. However, in order to obtain a detailed review, this information was further separated into each of the main areas of the Parklands to compare actual and anticipated removals for those areas. The following summarises the outcome of five years of tree removals within Centennial Park:

RESULTS: CENTENNIAL PARK

Botanical Name	Total
Acacia binervia	1
Acacia cynaphylla	28
Acacia decurrens	6
Acacia maidenii	1
Acacia sp.	1
Araucaria heterophylla	1
Casuarina cunninghamiana	7
Casuarina glauca	2
Erythrina x sykesii	48
Eucalyptus botryoides	13
Eucalyptus cinerea	1
Eucalyptus ficifolia	1
Eucalyptus haemastoma	2
Eucalyptus maculata	12
Eucalyptus microcorys	1
Eucalyptus robusta	2
Eucalyptus sp.	1
Ficus macrophylla	1
Ficus obliqua	1
Ficus rubiginosa	14
Grevillea robusta	1
Liquidambar styraciflua	2
Lophostemon confertus	1
Melaleuca armillaris	2
Melaleuca quinquenervia	9
Phillyrea latifolia	1
Phoenix canariensis	17
Phoenix reclinata	3
Pinus pinaster	56
Pinus radiata	4
Platanus x hybrida	2
Populus alba	15
Quercus ilex	9
Quercus virginiana	1
Salix babylonica	20
Washingtonia filifera	9
Grand Total	**296**

Based on these results, there are no clear parallels that can be drawn between anticipated l tree removals over say, the next 15 years and actual tree removals over the past 5 years. Actual removals over that period are likely to be less than the totals suggested by SULE of between <5 to 15 years for each species.

Exception to this are *Erythrina x sykesii*. Of the total of 59 Corals removed over the last 5 years, most (68%) were removed due to storm damage, windthrow or structural failure. Only 29% were removed as part of a hazard reduction programme. Similar paralells can be drawn for *Pinus pinaster*.

As a side result of this analysis, 78% of all tree work relating to removals is reactive work i.e. removals in response to tree failure, storm damage, windthrow or removal of dead trees.

Only 4% of tree removal work can be described as proactive hazard reduction work.

The results for Moore Park and Queens Park also failed to provide clear parallels between actual and anticipated removals. However, actual removals on these sites did reflect the poor site conditions, lack of maintenance in the establishment period, poor site preparation, poor plant selection and probably poor quality plant stock initially. Removals also did reflect the rate of decline and removal of the characteristically shorter lived tree species.

These results have important implications for all future plantings across these areas, particularly if native species are to be used. This is strengthen by observations of the poor performance of much of the young to semi-mature plant material across these parks.

5.4.1 ISSUES ARISING FROM ANALYSIS OF TREE LOSS AND REMOVALS

- Although actual removals in recent years do not strongly correlate with the predictions arising from the SULE ratings, it must be remembered that with each passing decade, the rate of tree decline among this already old to over mature tree population will increase.
- The results of the actual tree removal figures indicate that SULE ratings in no way allow for the damage and loss of trees due to storm events. The high exposure of trees to storms across the Parklands means that even if the anticipated rate of decline arising out of the SULE ratings is not as severe as first indicated, the effects of storm damage will probably balance out the final figures.

RESULTS: MOORE PARK AND MPGC

Botanical Name	Total
Acacia binervia	2
Acacia cynaphylla	23
Acacia decurrens	1
Acacia elata	1
Acacia longifolia	2
Acacia sp.	22
Agonis flexuosa	1
Banksia sp.	2
Callistemon viminalis	1
Casuarina cunninghamiana	10
Casuarina glauca	1
Erythrina x sykesii	5
Eucalyptus botryoides	7
Eucalyptus maculata	1
Eucalyptus microcorys	1
Eucalyptus robusta	1
Eucalyptus sp.	73
Ficus macrophylla	1
Ficus microcarpa var ‘Hillii’	17
Ficus rubiginosa	4
Ficus superba var. henneana	1
Lophostemon confertus	7
Melaleuca armillaris	14
Melaleuca quinquenervia	17
Melaleuca sp.	1
Metrosideros excelsa	2
Phoenix canariensis	3
Pinus pinaster	1
Pinus radiata	2
Pinus sp.	1
Podocarpus elatus	1
Populus deltoides	1
Populus nigra ‘Italica’	7
Populus sp.	1
Quercus ilex	1
Quercus robur	1
Salix babylonica	1
Shinus areira	5
Grand Total	**243**

5.5 CURRENT AND FUTURE TREE MANAGEMENT ISSUES

Effective management of the tree population across the large areas of Centennial Parklands is the result and interaction of a complex set of factors. The following chart represents some of the interactions that occur and that influence tree management decisions.

These issues will become more pronounced as the current mature to over mature tree population ages further. Over the next 40 years, the various issues arising from extensive tree removals will become critical. Adequate resources to manage both the existing and replacement tree populations will be essential. To fulfill expectations of a safe environment and a landscape consistent with the current appearance of the Parklands.

Some of the factors that influence the allocation of resources, necessary to aid effective tree management, are summarised by the following:

5.5.1 HAZARD MANAGEMENT

- Safety is the most important issue – maintenance of a safe environment for park users and staff.
- Allocation of resources to different activities e.g. annual lifts over Grand Drive.
- Different level of hazard management to different areas e.g. woodlots vs. Grand Drive / Centennial Park vs. ES Marks Field.

5.5.2 PUBLIC EXPECTATIONS

- Appearance of the parks, in particular, the trees.
- Perceived high level of concern over tree removals vs. new planting.
- Public's sense of ownership of the parks.
- Stockpiling of materials.
- Car parking and resultant impacts on trees.
- Methods of effective communication with public in light of likely changes to appearance of the Parklands over next 20 to 40 years.

5.5.3 STAFF AVAILABILITY

- Staff numbers for existing work load vs. future (possibly increasing work load).
- Involvement of staff in other activities – other than actual tree work.
- Allowance for time lost due to staff on leave / sick / RDOs.
- Different level of tree management to different areas e.g. woodlots vs. Grand Drive.
- Implications for future staffing levels – alternative approaches, for example; contracting tree work and removals – requirements for Parklands staff supervision of work standards.

5.5.4 AGE STRUCTURE OF TREE POPULATION

- Mature to over mature age structure – require more resources over time.
- Different rates of decline of different species.
- Waste disposal as rate of removals increases over time – costs and materials handling.

5.5.5 REACTIVE vs. PROACTIVE MAINTENANCE APPROACH

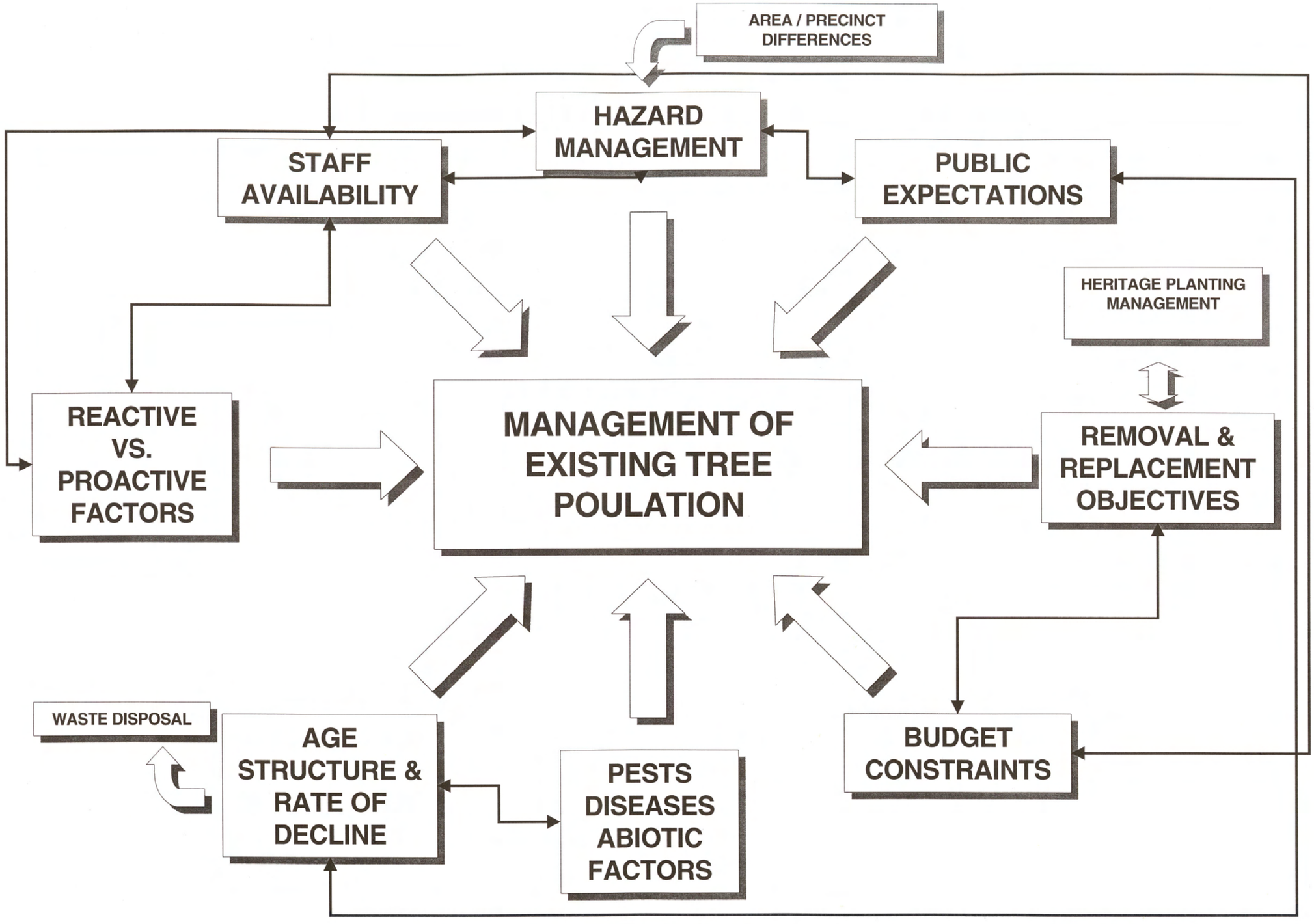
- Currently limited time / opportunity for staff to carry out proactive tree management work other than traditional work patterns arising out of routine maintenance practices (e.g. Grand Drive and Horse Track annual crown lifts).
- Aging trees will require more proactive work to satisfy safety objectives
- Allocation of time to other maintenance activities – external roadways / clearance of utilities.
- Impacts of storm events – effects on other tree management and planting programs / insurance implications

5.5.6 CONTROL OF PESTS AND DISEASES

- Impacts of endemic pests (e.g. Fig psyllid) and new diseases and pests (e.g. Cuban Laurel Thrip).
- Control of soil borne diseases.
- Opportunities for trialing / researching new methods of pest and disease control. Therefore establishment of guidelines for new approaches to management practices.
- Changes to existing management practices.
- Implications of other changes in the park to tree management e.g. change from Parklands staff to contract mowing – impacts on tree trunks / roots / rootzones.

5.5.7 REMOVAL AND REPLACEMENT OBJECTIVES

- Safety management.
- Staging tree removals.
- Treatment of Heritage / memorial plantings.
- Currently just working on basis of replacing those trees cut down either with the same or suitable replacement species.



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MANAGEMENT OF EXISTING TREE POPULATION

Drawing No: V 2.13

0 250 500m

Scale: 1:10,000 @A3 approx