NY00042

TREENET Pilot study of street tree planting in South Australia

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Adelaide University

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TREENET
Pilot study of street tree planting in South Australia

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Purpose of the report:

TREENET surveyed five South Australian street tree growers and 33 Local Governments to assess both the perceptions and practices of street tree growers and those of their major consumers, and to determine industry and consumer expectations, requirements and concerns about street trees. The Nursery Industry, as provider of millions of dollars of street tree stock annually, will be able to draw on the results of this survey. By identifying customer needs and expectations and issues associated with the establishment, maintenance and performance of street trees, less stock will need to be discarded and customer needs can be anticipated and met in the long term.

The pilot study also canvassed support for establishing and monitoring street tree trials offering opportunity to test unconventional tree species and new methods. There was strong interest in participating in these trials which will generate much useful information for all stakeholders including the Nursery Industry, Local Government and service providers.

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Lawrys Nursery
Freshford Nursery
Fleming's Nurseries
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Cleveland Nursery
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City of Holdfast Bay
City of Marion
City of Mitcham
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CONTENTS

LIST OF TABLES

1. MEDIA SUMMARY

This pilot study surveyed 5 advanced street tree growers and 33 local governments in SA.

The Nursery Industry supplies millions of dollars of street tree stock annually.

The goals of the survey were:

- Assess current perceptions and practices
- To identify customer needs
- To identify street tree performance
- To determine industry and consumer expectations and concerns
- To assess interest in establishing TREENET trial sites

Key outcomes:

There was broad consensus amongst respondents that the availability of quality information about tree species and their suitability as street trees was one of the most important factors to the success of tree planting programs, along with quality of tree stock and site conditions.

- Customer needs and expectations identified by this pilot Local Government survey will help tree growers in their forward planning to better meet those needs.

- Nurseries will be able to diversify their stock and produce trees which have been demonstrated to be successful through TREENET trials, both in the Waite Arboretum and in the urban street environment.

- Involving tree growers in the street trials provides opportunities for growers to influence their consumers, by offering them new species for testing.

- The results of these pilot surveys will be of use not only to the Nursery Industry and Councils, but also to landscape architects, urban planners, tree training providers and arborists.

- Benefits to Local Government will be better information for species selection, better quality of stock, closer liaison with producers, lower maintenance costs, reduced infrastructure damage and less exposure to litigation.

2. TECHNICAL SUMMARY

Two pilot studies were devised. The aims were to assess the perceptions and practices of street tree growers and those of their major customers - Local Government, to determine industry and consumer expectations, requirements and concerns and to provide an overview on a broad range of issues relevant to both street tree producers and consumers.

A survey of 96 questions relating to street trees was sent to 68 Councils listed under the Local Government Act in South Australia, of which 33 responded. The survey canvassed issues such as operations, policy and planning, personnel, suppliers, infrastructure, risk management, costs, ages and species of existing trees and trends in new plantings.

Information was gathered from the five advanced tree growers in S.A. through written and oral surveys, TREENET field trips to trial sites, formal meetings and workshops and industry networks.

Most of the advanced tree growers saw the market as national, rather than local, and long standing interstate trade is being facilitated as S.A. nursersies are becoming accessible on-line. However, S.A. nurseries, with a few notable exceptions, have not been generators of new varieties, and have mostly copied trends from interstate, a conservative approach which has not always been successful.

The five nurseries were unanimous in recognising TREENET as a contributor to their future success and identified species trialing and development of closer relationships with stakeholders in street tree issues as the principal benefits.

Infrastructure damage especially to roads footpaths and kerbs, emerged as the main reason responding Councils were dissatisfied with existing plantings, and pavement damage causing tripping hazard was one of the main reasons for personal injury, along with slippery paths caused by tree litter. Factors most influential on the success of planting programs were those relating to the Nursery Industry, such as availability and quality of stock and information available on the performance of different species.

Many Local Governments perceived a need to broaden the palette of species used as street trees, particularly species and cultivars better suited to the hot, dry summer climate of much of S.A. While many Councils were phasing out eucalypts, others were planning to plant more indigenous species because of their suitability to local conditions, long life and environmental benefits. There is however, a great need to improve native species with selection for good form. Many Councils expressed an interest in establishing and monitoring trial sites, facilitated by TREENET. Trial sites established to date have shown promise.

It is recommended that a national survey open to more than 700 Councils be undertaken, informed by the pilot surveys and based around the key issues which emerged in the results. Future surveys will be shorter and more focussed. Responses will be entered on-line and automatically processed. Analysis of the results will be more sophisticated and would be available for immediate dissemination and Other groups could be targeted e.g. professional arborists, surveys of which would provide very useful feedback to the Nursery Industry, Councils and service providers.

3. INTRODUCTION

3.1 Background

TREENET (Tree and Roadway Experimental and Educational Network) is a collaborative established in 1997 with the aims of improving the selection, production, establishment and maintenance of street trees. It will do this by providing a focus for coordinating and sharing information and by facilitating the establishment of trial sites to test unconventional species and new cultivars in situ in a variety of conditions. A national database including cultural, edaphic, climatic, establishment and species performance information will be developed and published on the TREENET website *www.treenet.com.au*. Technology transfer and the dissemination of the results of market and other research are also promulgated at TREENET's annual symposia.

TREENET is based at the Adelaide University's Waite Arboretum. The Waite Arboretum was established in 1928 and comprises over 2,200 labelled trees and shrubs from all over the world, grown under natural rainfall. Part of the impetus to establish TREENET came from the recognition that in the Waite Arboretum there are many species that merit consideration for use as street trees, but are untried in the roadway environment. By bringing together tree growers and the major purchasers of street trees such as Transport SA and Local Governments. TREENET facilitates the testing of these species in monitored trial sites and make the resulting information freely available. In addition, reference specimens of new cultivars are planted in the Waite Arboretum which provides a long term, secure, and well documented testing site.

As well as experimentation, education is an important component of TREENET's mission. Strong links have been established with all levels of arboricultural and landscape training, from secondary and TAFE Colleges to undergraduate and postgraduate University.

TREENET's Advisory Board (Attachment A) has broad representation reflecting its goals. Members represent the nursery and landscape industries, the education and research sectors, Local and State Government, economics and the horticultural media and they bring to TREENET a wealth of expertise and experience.

3.2 Aims of the study

Two pilot surveys were devised. One was sent to the 68 Councils listed under the Local Government Act in South Australia. The other pilot study was sent to the five tree nurseries in South Australia currently supplying street trees to Local Government.

The aims were to assess both sides of the Nursery Industry equation: the perceptions and practices of street tree growers and those of their major consumers, and to determine industry and consumer expectations, requirements and concerns about street trees.

In this pilot project the surveys were conducted only within South Australia, with a view to developing national surveys, informed by the pilot studies, at a later time.

3.3 Implications and significance for the Nursery Industry

The results of these surveys will provide useful feedback to the Nursery Industry about the current street tree market, level of satisfaction with species currently being produced and interest in trying new cultivars and unconventional species.

Planting, establishment and monitoring of trees requires a considerable investment by Councils. For this reason there is a tendency towards conservatism - to plant what has been planted before or what other Councils are planting. There is reduced incentive for nurseries to try and introduce new or unconventional species in the face of this conservatism. It is safer to continue to produce the current favourites, even if these are determined by interstate markets with quite different climates. Nurseries which are prepared to try new species, must put much time into marketing them in addition to producing them. Conversely, those Councils which would like to experiment with unconventional species may have difficulty sourcing material as nurseries may be unwilling to stock unproven material.

3.4 Impact of the results

The results of these surveys will provide useful feedback to the Nursery Industry and hopefully will encourage the establishment of trial sites to the benefit of both the industry and its customers. The search is ongoing for species better adapted to local climate and soils, and better meeting the often conflicting needs and requirements of street trees and services in the street environment. The information provided by these surveys will help to inform the Nursery Industry about customer expectations, so that all stakeholders can work together towards improving the streetscapes of our urban environment.

4. METHODS

4.1 Nursery Industry Survey

There are only five nurseries in South Australia which identify the urban tree market as a significant component of their turnover annually (Table 1).

Table 1. S.A. Nurseries surveyed

Cleveland Nursery
Freshford Nursery
Heynes Nurseries
Lawry Nursery
Manor Farm Nursery

TREENET was able to gather information for this report through

a) surveys (written and oral)
b) TREENET field trips to trial sites
c) formal meetings / workshops
d) industry networks.

Issues canvassed included:

- Size of the market
- Species of trees currently stocked
- % material sourced from interstate
- % trees grown specifically as street trees
- Anticipated market growth
- Avenues of enquiry currently used to assess customer needs.
- Perceived market opportunities
- Current tree production regimes
- Perceived benefits of the TREENET program
- Suggestions for the aspects of TREENET they would like to see developed as producers
- Interest in workshops / seminars / trial sites

With such a small sample size of respondents, who indicated annual turnovers ranging from less than $200,000 to a few million dollars (no accurate turnover figures given), and the generally imprecise nature of information available (or volunteered) it is not appropriate to apply any statistical analysis to the data.

4.2 Local Government Survey

This survey was compiled with input from the TREENET Advisory Board and representatives of Councils involved in the TREENET trial site program.

The Local Government survey was divided into 8 sections. Section A ascertained information about the survey respondents and the Local Governments they represented. Section B concerned operational issues. Section C dealt with tree data recording and Section D with policy and planning. Sections E & F related to personnel, suppliers and contractors, Section G to community involvement and Section H ascertained interest in participating in TREENET trials and attending symposia.

The majority of questions were in a yes / no or multi-choice form, though some questions required ranking different categories or adding $ amounts or other specific numeric or species information.

A copy of the Local Government survey is attached (Attachment B), and the results of these surveys are presented and analysed below. The number of respondents to each question is indicated. The majority of respondents answered most of the questions.

5. RESULTS

5.1 Nursery Industry Survey

The key factors affecting the production of street trees in South Australia would cause few surprises and are summarised below.

Annual production of trees in South Australia, specifically for planting in urban roadways is estimated at $1.1 M. Approximately 15% of this production was exported to other States. In contrast to the low 'export' volumes, the respondents source significant numbers of semi-advanced and advanced trees from interstate on behalf of contracting and Local Government clients.

The principal suppliers to South Australia are nurseries in Victoria, although with growing interest in east coast species (see Table 2) there is an increasing influence from Queensland and Northern NSW on local supply. Victorian nurseries have continued to be the principal ultimate suppliers of deciduous trees to South Australia.

Table 2
List of recent introductions to the street tree market in S.A. from N.S.W. and Qld nurseries
* donates species currently in TREENET trial sites

*	Buckinghamia celsissima
*	Cassia brewsteri
*	Castanospermum australe
*	Cupaniopsis anacardioides
*	Elaeocarpus reticulatus
*	Flindersia australis
	Flindersia xanthoxyla
*	Geijera parviflora
*	Harpullia hillii
*	Harpullia pendula
	Jagera pseudorhus
	Koelreuteria bipinnata
	Syzygium spp.
	Toona ciliata

Only one of the five S.A. respondents produced significant numbers of bare root one and two year old trees for the local market. The cool temperate climate in Adelaide combined with this lack of local supply has brought about the circumstances of the large local demand coming out of Melbourne. This is an increasing trend as new varieties, particularly from Flemings Nurseries, are sought after and introduced into TREENET trial sites (see Table 3).

Table 3
List of species in TREENET trial sites in the City of West Torrens, S.A.
* indicates recent introductions from Fleming's Nurseries, Vic.

	Acer buergerianum
*	Acer campestre 'Evelyn'
	Acer monspessulanum
	Acer pseudoplatanus
*	Acer x freemanii 'Jeffersred'
	Caesalpinia ferrea
	Cercis canadensis
	Corymbia 'Summer Red'
	Cupaniopsis anacardioides
	Elaeocarpus reticulatus
	Flindersia australis
	Flindersia xanthoxylon
	Geijera parviflora
	Harpullia pendula
*	Lagerstroemia indica x fauriei 'Tuscarora'
	Pistacia chinensis
*	Pyrus calleryana 'Capital'
*	Pyrus calleryana 'Chanticleer'
	Quercus ilex
	Sapium sebiferum
	Sophora japonica
	Stenocarpus sinuatus
	Zelkova serrata

The other four S.A. respondents purchase most young bare root stock from Victoria and grow them on for one or two years, mostly in containers. One respondent (Cleveland Nursery) puts a significant proportion of this production into Root Control Bags.

The typical South Australian product is therefore a 2 - 3 year old tree in a 50 L - 100 L container - semi advanced rather than advanced stock, although the trend is to produce some advanced stock 150 L or bigger to take advantage of the uncompetitive freight costs from the eastern States.

The biggest single customer of advanced trees in South Australia is Transport SA which prefers trees in the 4 - 5+ m range for their major and arterial roads. Over the past five or so years, they have sourced thousands of trees (mostly *Platanus orientalis*) from Victoria. Other significant suppliers to Transport SA have come from Western Australia (*Washingtonia* and *Ficus*) and Queensland (*Livistonia australis*).

There is a marked consensus amongst the respondents as to the opportunities and risks associated with the street tree market. TREENET was universally identified as an opportune and effective agent in generating more profitable outcomes for the

respondents. (The nurseries involved generally provided some funding for this project).

In addition to the five nurseries cited, TREENET has been approached by several nurseries from other States seeking involvement and feed back from the program. Those nurseries represent the major supply of street trees into the Australian market, and as the report shows, to South Australia. There is considerable merit in extending the TREENET Nursery survey nationally some time in the future.

5.2 Local Government Survey

Of the 68 Councils listed under the Local Government Act in South Australia, 65 agreed to complete the survey and 33 actually responded. This is a high response rate for this type and length of survey.

Section A. Survey respondent details (Questions 1-16)

Q1 Name of Local Government Authority

Table 4
List of Local Governments which responded to this survey

Adelaide City	Mallala	Port Pirie
Adelaide Hills	Marion	Robe
Alexandrina	Mitcham	Salisbury
Burnside	Mount Barker	Tumby Bay
Campbelltown	Mount Gambier	Wakefield
Coober Pedy	Mount Remarkable	Walkerville
Coorong	Murray Bridge	Wattle Range
Copper Coast	Norwood, Payneham & St Peters	West Torrens
Franklin Harbour	Playford	Whyalla
Grant	Port Adelaide / Enfield	
Kangaroo Island	Port Augusta	
Karoonda	Port Lincoln	

12 (35%) of the 33 responding Councils were from metropolitan Adelaide.

Q 2 - 5 Names and contact details. This information was mainly for administrative purposes and is not elaborated here. Q 6 - 10 ascertained details about the respondent

Q6 Respondent qualifications (29 respondents)

21% held degrees: B. Eng. (2), B. Appl. Sc. (1), B. Hort. Sc. (1), B. Sc. (1) and B. Land. Arch. (1)
64% held Certificates, Advanced Certificates or Diplomas in Horticulture
14% held other Diplomas in Surveying, Science & Natural Resource Mgt or Local Government.

One person responded that he had no qualifications.

Of the 28 respondents with a qualification,
75% of respondents held qualifications in a discipline directly related to trees i.e. horticulture, landscape architecture, natural resource management.
7% more had qualifications relating to science generally
11% had qualifications relating to engineering and surveying
7% had qualifications relating to local government

Q7 Length of time in current position (33 respondents)

The range of time was 3 months to 25 years, with an average of 5.7 years.

99% had been in their current position less than one year
79% 1 - 10 years
12% more than 10 years

Q9 Membership of relevant organisations (only 11 respondents indicated memberships)

Relevant organisations cited were as follows:
Australian Institute of Horticulture (4)
Parks & Leisure Australia (4)
Australian Institute of Landscape Architects (2)
South Australian Society of Arboriculture (2)
Local Government Supervisory Officers Association (2)
Royal Horticulture Institute (London) (1)
Australian Institute of Landscape Designers & Managers (1)
National Arborists Association of Australia (1)
A. P. S. E. M. A. (Engineers) (1)
Trees for Life (1)
Tailem Bend Revegetation Group (1)

Q10 Previous attendance at a conference related to urban trees (33 respondents)

49% indicated yes
51% indicated no

26 Councils (38% of SA Councils) sent delegates to the inaugural TREENET Symposium in 2000.

Q 11-16 recorded area, population size and surveyed infrastructure issues such as length of roadways under Local Government and Transport SA control, length of roadways with overhead powerlines and types of cabling. These questions provided an insight into the environment both in the extent and the nature into which street trees are planted. The results are summarised in Tables 5 & 6

Q11 Total population under Local Government Authority (29 respondents)

The population range was 1,250 to 101,000 with average size 24,349.

Q12 Total area under Local Government Authority (26 respondents)

Area range was 4 - 388,025 sq. km, average 23,243 sq. km.

Q13 Total length of urban roadways under Council control (25 respondents)

Range 31 - 2,000 km, average 356 km.

Q14 Total length of urban roadways under Transport SA control (26 respondents)

Range 0 - 116 km, average 23 km.

Table 5
Summary of respondent Councils: populations, areas and lengths of roadway under local Government and Transport SA control.

Council	Population	Area (sq. km)	Urban roads - LG (km)	Urban roads TSA (km)
1	15000	15	880	0
2	38500	800	400	20
3	-	-	-	-
4	41000	28	250	27
5	45000	23	250	0
6	3000	-	101	17
7	-	-	-	-
8	9883	756	-	-
9	1250	3160	31	2
10	11200	188493	1045	0
11	4500	7500	250	2
12	1323	1600	-	2
13	7000	970	-	-
14	78000	54	451	42
15	60000	75	380	0
16	26000	590	226	116
17	2300	-	185	19
18	3027	3422	2000	0
19	15885	183	143	9
20	35000	14	171	0
21	63369	345	-	-
22	101000	97	623	106
23	14200	1440	420	60
24	13000	3849	154	14
25	18000	-	150	12
26	1400	110	29	5
27	-	-	-	-
28	2400	-	40	2
29	6900	1701	63	6
30	-	4	36	8
31	12880	388025	-	-
32	51600	37	282	40
33	23500	1037	328	84
Average	24349	23243	356	23

Q15 Total length of roadway with powerlines (17 respondents)

Range 8 - 1,025 km, average 296 km

Q16 Type of cabling (19 respondents)

Respondents were asked to indicate the % of their powerlines in each of four classes

(1) aerial bundling
(2) high voltage
(3) underground
(4) other

84% of respondents indicated some aerial bundling in their area
Range nil to 717.5 km, average 66 km.
89% of respondents indicated some high voltage lines
Range nil - 324 km, average 113 km.
84% of respondents indicated some underground lines
Range nil - 108 km, average 21 km.

It should be noted that the average length of roadway of respondents was 379 km (Q13 + Q14), of which an average of 296 km was influenced by powerlines. Results are tabulated in Table 6.

Table 6
Length of roadways with overhead powerlines and types of cabling

Council	Length (kms)	Aerial Bundling		High Volt.		Underground		Other
		%	*kms*	%	*kms*	%	*kms*	%
1	800	0%	0	30%	240	10%	80	60%
2	410	30%	123	40%	164	3%	12.3	27%
3	-	-	-	-	-	-	-	-
4	-	-	-	-	-	-	-	-
5	-	1%	-	5%	-	25%	-	69%
6	-	1%	-	25%	-	3%	-	71%
7	-	-	-	-	-	-	-	-
8	-	-	-	-	-	-	-	-
9	33	5%	1.65	0%	0	1%	0.33	94%
10	1025	70%	717.5	30%	307.5	0%	0	0%
11	-	0%	-	100%	-	0%	-	0%
12	-	-	-	-	-	-	-	-
13	-	-	-	-	-	-	-	-
14	340	-	-	-	-	-	-	-
15	-	-	-	-	-	-	-	-
16	540	20%	108	60%	324	20%	108	0%
17	170	0%	0	0%	0	5%	8.5	95%
18	-	-	-	-	-	-	-	-
19	129	5%	6.45	90%	116.1	5%	6.45	0%

20	-	-	-	-	-	-	-	-
Council	**Length (kms)**	**Aerial Bundling**		**High Volt.**		**Underground**		**Other**
21	-	-	-	-	-	-	-	-
22	700	1%	7	33%	231	3%	21	63%
23	314	15%	47.1	65%	204.1	20%	62.8	0%
24	8	10%	0.8	35%	2.8	20%	1.6	35%
25	97	10%	9.7	40%	38.8	10%	9.7	40%
26	20	10%	2	70%	14	20%	4	0%
27	-	-	-	-	-	-	-	-
28	36	80%	28.8	10%	3.6	10%	3.6	0%
29	63	5%	3.15	95%	59.85	0%	0	0%
30	40	2%	0.8	35%	14	5%	2	58%
31	-	-	-	-	-	-	-	-
32	300	1%	3	30%	90	4%	12	65%
33	-	-	-	-	-	-	-	-
av.	296	14%	66	42%	113	9%	21	36%

Section B. Operations

This section dealt with operational and budget issues listed below.

Q17 Annual budget (27 respondents)

Respondents were asked to estimate their annual street tree budget to the nearest $1,000. The mean was $242,444 with a range of nil to $1,293,000.

Q18 Budget for street trees (31 respondents)

23% increasing
70% static
7% decreasing

Q19 Current street tree budget (31 respondents)

35% inadequate
20% adequate
nil excessive

Q20 External funding (29 respondents)

10% yes, external funding - but none of these indicated the source (Q21)
90% no external funding

Q22 % budget for education and training (26 respondents)

Range of nil to 10%, average was 2.45%

Q23 % budget for contractors / consultants (25 respondents)

Range of nil to 33%, average was 9.6%

Conclusions

Of particular relevance to the Nursery Industry is the current state and trend in budgeting for the purchase, installation and maintenance of street trees. The average annual budget was $242,000 with a range from nil to $1.3M. The funding for the process for installing street trees is only marginally increasing annually overall, with 70% of respondents indicating no change from year to year. With two thirds of respondents expressing satisfaction with current level of funding for street trees, no great pressure can be expected Councils to increase expenditure on the total cost of supplying, installing and maintaining street trees.

Q24 % of overall work hours spent on street trees in your department (23 respondents)

Range of 1 to 85%, average 21%

Q25 Current cost per tree for the first three years of establishment.

Respondents were asked to estimate the current cost per tree for the first 3 years of establishment in 7 different categories:

(1) tree purchase
(2) planting materials, fertiliser
(3) labour
(4) maintenance - watering
(5) maintenance - staking, formative pruning
(6) maintenance - weed, pest & disease control
(7) administration

The Results are tabulated in Table 7.

Table 7
Current estimated costs per tree for the first 3 years of establishment

Council	Tree purchase	Fertiliser	Labour	Water	Staking	Weeding	Protect	Admin
1	$125.00	$35.00	$56.00	$80.00	$46.00	$46.00	$0.00	$140.00
2	$200.00	$10.00	$40.00	$60.00	$45.00	$30.00	$0.00	$0.00
3	$5.00	$1.00	$5.00	$20.00	$20.00	$10.00	$10.00	$5.00
4	$280.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
5	$40.00	$20.00	$20.00	$13.00	$5.00	$3.00	$0.00	$5.00
6	$2.00	$1.00	$3.00	$3.00	$1.00	$3.00	$2.00	$0.00
7	-	-						
8	$2.00	$1.00	$10.00	$5.00	$25.00	$5.00	$0.00	$1.00
9	$2.00	$0.00	$0.00	$2.00	$0.00	$0.00	$0.00	$1.00
10	$4.00	$6.00	$6.00	$6.00	$0.00	$4.00	$70.00	$4.00
11	-	-						
12	-	-						
13	-	-						
14	-	-						
15	-	-						

16	$25.00	$12.00	$10.00	$2.00	$3.00	$3.00	$8.00	$16.00
Council	Tree purchase	Fertiliser	Labour	Water	Staking	Weeding	Protect	Admin
17	-	-						
18	-	-						
19	-	-						
20	$20.00	$20.00	$40.00	$90.00	$30.00	$20.00	$10.00	$50.00
21	-	-						
22	$23.00	$5.00	$55.00	$95.00	$17.00	$21.00	$3.00	$10.00
23	$1.00	$3.00	$70.00	$40.00	$60.00	$20.00	$10.00	$5.00
24	$47.00	$25.00	$25.00	$30.00	$60.00	$30.00	$30.00	$60.00
25	$2.00	$6.00	$20.00	$60.00	$50.00	$40.00	$1.00	$0.00
26	-	-						
27	$15.00	$20.00	$50.00	$150.00	$0.00	$20.00	$10.00	$40.00
28	$5.00	$1.00	$40.00	$3.00	$5.00	$5.00	$20.00	$10.00
29	-	-						
30	$40.00	$10.00	$40.00	$180.00	$50.00	$10.00	$0.00	$30.00
31	-	-						
32	$30.00	$5.00	$15.00	$75.00	$50.00	$5.00	$0.00	$5.00
33	-	-						
Average	$45.68	$9.53	$26.58	$48.11	$24.58	$14.47	$9.16	$20.11

Conclusions

14 out of 33 respondents did not provide any response to this question. Of the 19 respondents, 8 indicated a tree purchase cost of ≤ $5 per tree. We believe that this reflects the large number of tube stock trees supplied by voluntary organisations such as Trees for Life in rural areas and the fact that 21% of trees planted are grown by the Councils themselves and not properly costed. Of the remaining respondents, 8 gave a purchase cost of $15 - $50 and 3 gave a purchase cost of $125 - $280.

As some Councils indicated a nil expenditure on the purchase of trees, and as the purchase cost in the rest were only averages, firm conclusions cannot be drawn.

The analysis of the data from 19 respondents relating to the average cost of establishment over the first three years suggests that major components of the establishment costs are as approximately as follows:

tree purchase	23%
planting materials, fertiliser	5%
labour	13%
watering	24%
staking & formative pruning	12%
weed, pest & disease control	7%
tree protection	5%
administration	10%

The average purchase cost of the tree is only 23% of the total cost ($45.68 out of $198). This is comparable to the cost attributed to watering. Those

Councils purchasing advanced trees ($200+) will spend approximately the same amount again in all other costs. Less than 10% of Councils are currently purchasing advanced trees of this cost indicating significant opportunities for the advanced tree nursery sector to improve their market share.

Q26 Factors influencing the success of planting programs (31 respondents)

Respondents were asked to rate listed factors influencing the success of planting programs on a scale of 1 (uninfluential) to 5 (very influential). The results are summarised in Table 8.

Table 8. Factors influencing the success of planting programs

Factor	Average Rating
1) Availability / quality of information on suitable species	3.9
2) Availability / quality of nursery stock	4.1
3) Difficult sites conditions	
3a) High heat loads / radiant heat	3.3
3b) Compacted / poorly draining soils	3.8
3c) Disturbed profiles	3.1
3d) Polluted soils/extreme pH	3.3
3e) Limited soil volume	3.3
3f) Other	
4) Availability of funds	3.9
5) Availability of human resources	3.8
6) Access to specialist knowledge / skills	3.3
7) Vandalism	3.7

Conclusions

Although all factors canvassed were considered to have a significant influence, of most interest to the Nursery Industry is the very high ranking revealed for factors relating to nursery stock.

Respondents indicated the most important factor to their success was the availability and quality of suitable trees. No differentiation was made between these two factors. However, it is clear that suppliers to this market sector have the opportunity to improve their sales by responding to customer requirements in this area more effectively.

The other major finding was that there is limited information available on suitable species. TREENET is facilitating the compilation and distribution of data and information by using species trials, workshop seminars and the on-line using the TREENET web-site. TREENET is also addressing quality issues at the 2001 symposium, at which Derek Moore will present his thesis on effect of container and production style on root quality.

Q27 Satisfaction with the street trees existing prior to respondent's involvement
(31 respondents)

Average ranking 2.4 out of 5.

13% very unsatisfied
48% unsatisfied
32% neutral
7% satisfied
nil very satisfied

Clearly, there is a significant dissatisfaction with street trees existing prior to the respondents involvement. This would suggest that there are opportunities for the Nursery Industry to liase with the local government sector, who are very receptive to any prospect of improvement, particularly in relation to species selection.

Q28 Factors affecting dissatisfaction with existing street trees
(31 respondents)

Respondents were asked to indicate (by a tick) factors which influenced their response to Q27. The % of respondents ticking each of the 7 factors listed was as follows.

57% Incorrect cultivation requirements
40% Poor condition
66% High maintenance requirements
47% Litigation risk / liability issues
80% Infrastructure damage
47% Too few trees
10% Too many trees

Conclusions

Issues relating to the Nursery Industry which are the most significant reasons given for dissatisfaction with existing plantings are infrastructure damage (80%) caused by the lack of information on suitable species, and high maintenance (66%) which is also an outcome of inadequate understanding of the performance and requirements of many species in the urban environment. Clearly there is a need for well documented street tree trials to provide more information on species performance.

With over 50% of respondents indicating that incorrect cultivation requirements was a reason for dissatisfaction, there is a clear need for best practice standards to be developed and Council staff to be adequately trained in tree planting and maintenance.

Q29 Ratings of factors causing personal injury by street trees (17 respondents)

Respondents were asked to rate the significance of seven listed reasons for personal injury caused by their street trees from 1 (uninfluential) to 5 (very influential). Results are summarised in Table 9.

Table 9. Factors causing personal injury by street trees

Factor	Average rating
1) Limb fall	1.7
2) Eye-level foliage/branches	2.4
3) Blocked line-of-sight	2.9
4) Litter / slippery path	2.8
5) Respiratory Irritation	2.0
6) Paving damage causing tripping	3.8
7) Poisoning	1.0

Conclusions

By far the most important contributor to personal injury is damage to paving caused by root systems. No significance was attributed to poisoning as a factor in personal injury caused by street-trees.

For the Nursery Industry the survey would indicate a move away from trees such as white cedar *Melia azadarach* and Queensland brushbox *Lophostemon conferta* with marble-like fruit. The results also highlight the need for trees with less tendency to lift pavements and the potential use of root control barriers when planting new trees.

Q30 Reasons for property damage (28 respondents)

Respondents were asked to rate seven reasons for property damage caused by street trees from 1 (uninfluential) to 5 (very influential). The results are summarised in Table 10.

Table 10. Reasons for property damage caused by street trees

Reason	Average rating
1) Limb fall	2.3
2) Root invasion of pipes/drains	3.0
3) Building settlement	1.7
4) Trees blown over	2.8
5) Litter/sap	2.3
6) Displacement of kerbs, paths, roadway	3.9
7) Vehicle impact	1.5

Conclusions

Consistent with causes for personal injury, damage caused by roots to kerbs, paths and roadways and invasion of pipes and drains are the major causes of damage to infrastructure.

Trees blowing over through inadequate root systems were also significant causes of property damage. The major cause for these events is considered to be inadequate standards of production in the nursery. There is overwhelming evidence that the fundamental structural weaknesses which lead to wind-throw originate in the nursery. It would be interesting the speculate on the outcome of any legal proceedings which may result from actions by councils against offending nurseries.

Q31 Frequency of hazard reduction practices (33 respondents)

Respondents were asked to rate hazard reduction practices according to frequency of use (1- never used; 3 - used occasionally where possible; 5 - used immediately as required). The results are summarised in Table 11.

Table 11. Frequency of tree hazard reduction practices

Reason	Average rating
1) Whole limb removal	4.2
2) Crown lifting	3.6
3) Crown reduction	3.0
4) Cabling or bracing	1.5
5) Removal of one co-dominant stem	2.9
6) Dead wooding	3.7
7) Drop crotching	2.2
8) Included bark / limb removal	2.5
9) Root pruning	2.4
10) Installation of root barrier	2.7
11) Litter removal	3.1
12) Regular tree assessment	2.9

Conclusions

Canopy management in the form of limb removal, crown lifting and dead wooding were clearly the most frequent forms of hazard reduction. Techniques such as cabling or bracing or drop crotching were seldom used. Ironically while displacement of kerbs and paths by roots was identified as a significant and widespread problem in relation to personal injury and property damage, root pruning and root barriers did not feature highly in the hazard reduction practices of Councils.

Q32 Recycling of leaf litter and prunings (33 respondents)

Respondents were asked what recycling practices they used.

leaf litter

45.5% of respondents indicated leaf litter was composted / mulched
9% of respondents indicated that leaf litter went to landfill or dump recycling
45.5% of respondents indicated no recycling practice

prunings

88% of respondents indicated that prunings were chipped and used as mulch either by the Council or offered to residents and schools for use
3% of respondents indicated that prunings were dumped
9% of respondents indicated that they did nothing to recycle prunings

A high proportion of respondents recycled prunings, only a very small proportion of respondents took leaf litter or prunings to the dump. 86% of Councils which did not recycle leaf litter were regional Councils and presumably left the leaf litter in situ as mulch.

Q33 Systematic listing kept of maintenance operators on each tree or street, either individuals or groups? (33 respondents)

25% yes
75% no

Section C. Current tree statistics (Q 34 - 49)

This section dealt with tree inventories, age distribution, most common species, data recording and % mortality in the first three years to build up a picture of the current street tree profile.

Q34 Tree inventory (31 respondents)

42% yes
58% no

Q35 Of the respondents who answered no to Q35, how many intend to conduct a tree inventory? (17 respondents)

59% yes
31% no

Q36 The approximate number of urban street trees in Council area (19 respondents)

Range 60 - 80,000 with average 18,892 urban street trees

As only 42% of respondents maintained a tree inventory, the average number of street trees per Council area of about 19,000 trees is a best estimate.

Q37 Age distribution of street trees in Council area (29 respondents)

Respondents were asked to estimate the % age distribution of urban street trees in six categories:

(1) less than 5 years
(2) 5 - 9 years
(3) 10 - 19 years
(4) 20 - 49 years
(5) 50 - 80 years
(6) > 80 years

The results are tabulated in Table 12

Table 12
Age distribution of street trees in Council areas

Council	Approx. # Trees	Age (%)					
		Less than 5	*5 to 9*	*10 to 19*	*20 to 49*	*50 to 80*	*80 +*
1	7500	15.00%	15.00%	15.00%	40.00%	10.00%	5.00%
2	-	-	-	-	-	-	-
3	-	10.00%	20.00%	40.00%	10.00%	10.00%	10.00%
4	35000	15.00%	10.00%	5.00%	10.00%	50.00%	10.00%
5	20000	10.00%	20.00%	30.00%	20.00%	5.00%	5.00%
6	2500	50.00%	25.00%	25.00%	0.00%	0.00%	0.00%
7	-	10.00%	10.00%	30.00%	50.00%	0.00%	0.00%
8	-	5.00%	25.00%	32.00%	25.50%	10.00%	2.50%
9	900	20.00%	20.00%	15.00%	20.00%	20.00%	5.00%
10	1000	10.00%	30.00%	30.00%	20.00%	0.00%	0.00%
11	-	15.00%	37.00%	40.00%	5.00%	2.00%	1.00%
12	60	20.00%	20.00%	40.00%	20.00%	0.00%	0.00%
13	-	5.00%	20.00%	20.00%	50.00%	5.00%	0.00%
14	35000	15.00%	15.00%	20.00%	48.00%	1.60%	0.40%
15	-	-	-	-	-	-	-
16	40000	20.00%	15.00%	5.00%	35.00%	10.00%	15.00%
17	4500	5.00%	5.00%	10.00%	50.00%	20.00%	10.00%
18	-	0.00%	0.00%	0.00%	40.00%	10.00%	0.00%
19	-	15.00%	10.00%	15.00%	45.00%	10.00%	52.00%
20	20000	5.00%	10.00%	15.00%	60.00%	10.00%	0.00%
21	-	-	-	-	-	-	-
22	80000	20.00%	10.00%	10.00%	60.00%	0.00%	0.00%
23	30000	10.00%	10.00%	20.00%	50.00%	5.00%	5.00%
24	6000	5.00%	10.00%	20.00%	31.50%	31.50%	2.00%
25	3000	15.00%	15.00%	20.00%	40.00%	10.00%	0.00%
26	-	10.00%	20.00%	20.00%	25.00%	20.00%	5.00%
27	-	3.00%	10.00%	43.00%	40.00%	3.00%	1.00%
28	500	5.00%	40.00%	45.00%	5.00%	0.00%	0.00%
29	-	10.00%	10.00%	60.00%	20.00%	0.00%	0.00%
30	5000	15.00%	15.00%	20.00%	45.00%	4.00%	1.00%
31	-	-	-	-	-	-	-
32	45000	40.00%	25.00%	15.00%	15.00%	4.00%	1.00%
33	-	10.00%	15.00%	30.00%	40.00%	5.00%	0.00%
avg.	18664	13%	17%	24%	32%	9%	5%

Since only 18 of the respondents to this question gave an estimate of the number of trees in their Councils, a % of trees in each category cannot be calculated. However, the general impression given by the responses is that probably less than 15% of trees attain an age greater than 50 years.

Q38 10 most common species of tree planted (29 respondents)

The respondents were asked to list the 10 most common species of street tree currently in their areas from the most to the least common. Table 13 summarises the results, listing all the species cited by respondents and the % of respondents citing each species. The species are listed alphabetically.

Table 13

List of the 10 most common species in respondents' areas. The species are listed alphabetically, with percentage of respondents listing the species in their top ten.

Acacia calamifolia	3%
Acacia iteaphylla	3%
Acacia ligulata	3%
Acacia longifolia	3%
Acacia myrtifolia	3%
Acacia pendula	14%
Acacia pycnantha	3%
Acacia retinodes	3%
Acacia salicina	7%
Acacia sp.	14%
Acer negundo	3%
Agonis flexuosa	31%
Allocasuarina verticillata	3%
Araucaria heterophylla	10%
Banksia sp.	3%
Betula sp.	3%
Brachychiton populneum	7%
Callistemon 'Harkness'	52%
Callistemon 'Kings Park Special'	7%
Callistemon pallidos	3%
Callistemon salignus	10%
Callistemon sp.	17%
Callistemon viminalis	7%
Cassia brewsteri	3%
Casuarina glauca	3%
Casuarina sp.	3%
Casuarina stricta	3%
Celtis australis	14%
Celtis laevigata	3%
Celtis occidentalis	7%
Celtis sp.	7%
Corymbia ficifolia	14%
Cupaniopsis anacardioides	3%
Eucalyptus forrestiana	3%
Eucalyptus campaspe	10%
Eucalyptus diversifolia	3%
Eucalyptus eremophila	7%

Eucalyptus erythrocorys	3%
Eucalyptus gillii	3%
Eucalyptus intertexta	3%
Eucalyptus lansdowneana 'Purpurea'	3%
Eucalyptus lehmannii	3%
Eucalyptus leucoxylon [a]	38%
Eucalyptus occidentalis	3%
Eucalyptus platypus [b]	34%
Eucalyptus porosa	3%
Eucalyptus salmonophloia	7%
Eucalyptus salubris	7%
Eucalyptus sargentii	7%
Eucalyptus sideroxylon	3%
Eucalyptus socialis	3%
Eucalyptus sp.	17%
Eucalyptus spathulata	24%
Eucalyptus stricklandii	10%
Eucalyptus torquata	45%
Eucalyptus 'Torwood'	3%
Eucalyptus woodwardii	7%
Ficus hillii	7%
Fraxinus griffithii	3%
Fraxinus oxycarpa	10%
Fraxinus 'Raywoodi'	3%
Fraxinus sp.	10%
Gleditsia triacanthos 'Sunburst'	3%
Hakea laurina	10%
Hakea suaveolens	7%
Hymenosporum flavum	7%
Jacaranda mimosifolia	52%
Koelreuteria paniculata	38%
Lagerstroemia indica	3%
Liquidamber styraciflua	3%
Lophostemon confertus	31%
Melaleuca armillaris	17%
Melaleuca halmaturorum	7%
Melaleuca huegli	3%
Melaleuca lanceolata	10%
Melaleuca nesophila	3%
Melaleuca sp.	3%
Melaleuca styphelioides	3%
Melia azedarach	17%
Metrosideros excelsa	7%
Nerium sp.	3%
Photinia robusta	3%
Pinus halepensis	3%
Pinus sp.	3%
Pittosporum crassifolium	3%
Pittosporum sp.	3%
Pittosporum undulatum	3%
Plantanus x acerifolius	3%
Platanus orientalis	10%
Platanus sp.	7%
Prunus blireana	3%
Prunus nigra	3%
Prunus serrulata	3%

Prunus sp.	17%
Pyrus calleryana [c]	31%
Quercus coccinea	3%
Quercus robur	3%
Quercus sp.	3%
Sophora japonica	7%
Ulmus parvifolia	10%
Ulmus procera	3%

a. *Eucalyptus leucoxylon* includes subsp. *megalocarpa*
b. *Eucalyptus platypus*. The majority were var. *heterophylla*
c. *Pyrus calleryana* includes those listed as *P. ussuriensis* (?) and *Pyrus* sp. and includes one cultivar 'Bradford'

The six species cited by the most respondents are as follows:
52% cite *Jacaranda mimosifolia*
52% *Callistemon* 'Harkness'
45% *Eucalyptus torquata*
38% *Koelreuteria paniculata*
38% *Eucalyptus leucoxylon*
34% *Eucalyptus platypus*

If these most planted species are weighted according to rank on the respondents' lists, the order becomes (starting with the most planted):
Eucalyptus torquata
Callistemon 'Harkness'
Eucalyptus leucoxylon
Jacaranda mimosifolia
Eucalyptus platypus
Koelreuteria paniculata

Q39 Number of other species planted (21 respondents)

Range nil to 140 species, average of 26

Q40 Standardised data recording method (31 respondents)

Respondents were asked if they had a standardised data recording method.
22% yes
78% no

Q41 Participation in cross-Council standard (23 respondents)

Respondents who answered 'no' to Q40 were asked if they would be interested in participating in the development of a cross-Council standard.
97% yes
3% no

Q42 Information part of a public document? (5 respondents)

Respondents who answered 'yes' to Q40 were asked if their standardised data recording method was part of a public document.

80% yes
20% no

All respondents who indicated that they had a standard indicated they would be willing to let TREENET have a copy (Q43)

Q44 Computerisation of tree data (23 respondents)

Respondents were asked if their tree data was computerised.

44% yes
56% no

Q45 Use of special tree management software (19 respondents)

10% yes
90% no

Q46 Frequency of updating software (3 respondents)

2 indicated every 3 years, 1 as required

Q47 Special environmental conditions (29 respondents)

Respondents were asked to list the special environmental conditions which applied to their Council area. The responses included:

Arid / semi-arid / low soil moisture
Calcareous loam over limestone
Coastal,
Coastal, limestone
Compacted soil
Drainage poor
Gullies
Gully winds
Heavy reactive clays
High percentage of footpath fill
Hills
Hot north wind
Industrial landfill sites
Lack of natural runoff
Limestone rubble over clay
pH high
pH low
Pollution
Saline sand
Saline soil
Saline tap water in summer
Salt laden air
Variable soils
Winter frost

These varying condition highlight the need for testing species for suitability in a wide range of environmental conditions. TREENET has a role in collecting that information from its trial sites and disseminating it on its website, so that Councils with similar conditions can make informed choices of species.

Q48 Estimated mortality in the first three years (29 respondents)

The results are included in Table 9.
Range 2 - 40%, average 13%

Q49 Indication of changes in this % mortality (28 respondents)

7% increasing
64% static
29% decreasing

Section D. Policy & Planning

Q50 Tree management policy?(30 respondents)

Respondents were asked if they had a tree management policy
40% yes
60% no

Q51 If not, did the Council intend to produce one? (17 respondents)

53% yes
47% no

Q52 If so, is this a public document ? (14 respondents)

71% yes
39% no

Of the Councils responding yes, 77% indicated that this was a stand along document (*Q54*) and 67% indicated that the tree management policy was available / used in other areas of Council (*Q55*). The majority of respondents (87%) updated their policy every five years or less (*Q56).*

Q57 Perceived role of street trees (31 respondents)

Respondents were asked to indicate the role of street trees in their area as perceived by (1) the Council, (2) the ratepayers. More than one role could be cited.

(1) Perception by the Council

84% of respondents cited aesthetics

26% environment
13% amenity
13% shade
10% amelioration
Other positive perceptions included property value, traffic calming and historic value. Only one respondent cited a negative perception: costly.

(2) Perception by the ratepayers

53% of respondents cited aesthetics
35% shade
13% property value
10% environment
Other positive perceptions included amelioration, local character and screening. Negative perceptions included property damage and lots of work. Two respondents indicated that resident perceptions were variable or love / hate.

Conclusions

Aesthetics was an important perception by both groups. Shade was important to ratepayers. Street trees were perceived as affecting (increasing) property values by ratepayers.

Q58 Satisfaction with the current range of species available for street planting (31 respondents)

29% yes
71% no

This is clearly a challenge to the Nursery Industry to increase the range of species available and meet consumer expectations. TREENET trials will encourage nurseries to diversify and introduce new cultivars and unconventional species with potential merit, and will encourage Councils to test these introductions.

Q59 Interest in new species for trialing (31 respondents)

Respondents were asked if they would plant new species of street trees if they were offered for trialing

93% yes
7% no

This response is very encouraging and TREENET will be following up with the Councils which gave a positive response.

Q60 How far ahead are plantings planned (30 respondents)

Range 0 - 5 years, average 1 to 2 years.

Q61 How many trees are planned for planting over the planning period (20 respondents)

Range 15 - 4,500 trees average 1,221 trees.

Q62 Species planned to be phased out (22 respondents)

Respondents were asked which species were planned to be phased out during the planning period and why. The responses are summarised in Table 14.

Table 14
Species which Councils plan to phase out and the compiled reasons given

Species	Reasons
Acacia iteaphylla	too short lived
Acacia myrtifolia	prickly - not public friendly
Acacia pendula	unpleasant odour in flower
Acacia salicina	sucking habit problem for adjoining properties
Acacia spp.	short lived
Agonis flexuosa	blocking sewers, damage to kerbs, paths, roads
Allocasuarina verticillata	breaking kerb
Brachychiton populneum & other spp.	allergies, pavement & kerb damage, seed pods
Callistemon 'Harkness'	damage to kerbs, paths and roads, over frequently used
Casuarina spp.	suckering, road & paths damage
Celtis occidentalis	root damage, high maintenance requirement in first 1 - 5 years
Celtis sp.	too big
Eucalyptus (mallee species)	root damage, multi-trunked, limb fall, most residents hate them
Eucalyptus camaldulensis	too big
Eucalyptus cladocalyx nana	unsuitable habit
Eucalyptus erythocorys	bad habit, no apical dominance, heavy branches, laden with fruit causes limb drop - high risk
Eucalyptus gracilis	litter, untidy with age, path damage
Eucalyptus intertexta	poor form, too big
Eucalyptus lansdowneana	poor habit, no apical dominance
Eucalyptus leucoxylon ssp. megalocarpa & var. 'Rosea'	too large, kerb & road damage, elongated growth of branches causes regular limb drop - too risky

Species	Reason
Eucalyptus platypus	lateral branching, falling over, not wind firm, short-lived, poor root system, limb drop, damage to kerbs, roads, paths, crown lifting and reduction, too vigorous growth, too broad for footpath, trimming up increases likelihood of windthrow, termites
Eucalyptus sideroxylon	damage, too large
Eucalyptus spathulata	too large, lateral growth, roots causing damage to kerbs & paths, affected by borers & termites, windthrow
Eucalyptus spp.	lift kerbs, residents want low growing trees, too large, too messy
Eucalyptus spp. (Western Aust.)	short life span, dieback
Eucalyptus stricklandii	grows & flowers well but elongated growth of branches causes regular limb drop - too risky
Eucalyptus torquata & 'Torwood'	quite successful historically, but residents don't like them due to leaf litter, fruit drop, front fence stain, affected by borers when old (otherwise, very attractive flowers & attracts birds)
Fraxinus 'Raywoodii'	invasive roots
Fraxinus griffithii	over frequently used
Fraxinus oxycarpa	root damage, high maintenance, too large
Gleditsia triacanthos 'Shademaster'	tendency to revert to rootstock with characteristic spines
Koelreuteria paniculata	low tolerance to heavy soils, low tolerance to extreme heat and water stress
Lagunaria patersonii	itchy hair, seed capsules, damage to kerbs
Lophostemon confertus	poor performer, excessive seed drop, bark drop
Melaleuca armillaris	damage to kerbs, roads & paths, blocking sewers
Melia azadarech	excessive seed drop
Nerium sp.	high maintenance & liability to Council
Pittosporum crassifolium	breaking wood, obstructing powerlines
Platanus spp.	asthma, litter
Prunus	unsuitable
Prunus spp.	provide little shade, struggle in summer, susceptible to termites and borers
Pyrus calleryana	fruit damage
Robinia spp.	low tolerance of heat & aridity, can sucker
Schinus areira	high maintenance
Ulmus parvifolia	high maintenance, poor specimens
Ulmus procera	disease, invasive roots

Conclusions

The most common reasons given for phasing out species was root damage to kerbs, paths and road, too large, limb and litter drop, poor form, high maintenance, suckering and allergies or urticating hairs.

Short life was an issue with acacias. Many Local Governments were phasing out eucalypts as being too large, too much litter and root damage to infrastructure. *Fraxinus* species, once widely planted, are being phased out mainly because of root damage. Only one Council was phasing out *Pyrus calleryana* citing fruit drop as a problem.

Q63 Species planned to be introduced (20 respondents)

Respondents were asked which species they planned to be introduce during their planning period and why. The results are given in Table 15

Table 15
Species which Councils plan to introduce and the compiled reasons given

Species	Reasons
Buckinghamia celsissima	TREENET trial - appears suited, expand trial
Callistemon citrinus 'Western Glory'	small, neat habit, lush green foliage, tolerates heat
Cassia brewsteri	TREENET trial - so far very successful
Corymbia ficifolia 'Summer Red', 'Summer Beauty'	smaller than species, excellent flowering, good colour selection
Cupaniopsis anacardioides	TREENET trial - so far very successful
Elaeocarpus reticulatus	
Eucalyptus diversifolia	small to medium size for under powerlines
Eucalyptus erythronema	small, low maintenance, propagate locally
Eucalyptus forrestiana	attractive, good growth characteristics
Eucalyptus lesouefii	upright habit
Eucalyptus redunca	good shapely tree
Eucalyptus steedmanii	
Eucalyptus viridis	small attractive foliage, less litter
Fraxinus griffithii	only due to residents' requests; appears successful in other Councils, replacement for F. oxycarpa
Geijera parviflora	diversity, size and form suited to needs; TREENET trial - appears suited, expand trial
Grevillea	suitable street shrub
Koelreuteria paniculata	compliment architecture, proven value, deciduous, fast growing, hardy
Lagerstroemia indica x fauriei cultivars	on trial - appears to be ideal small tree for Adelaide
Lophostemon 'Paint Brush'	variegated leaf, small tree, exotic look, evergreen

Melaleuca quinquinervia	tolerates heavy, saline soils & hot conditions, good habit
Metrosideros excelsa	salt tolerant, uniformity
Myoporum insulare	indigenous
Myoporum platycarpum	indigenous
Pistacia chinensis	small, hardy, limited root problems
Pittosporum phylliraeoides	native, hardy, propagate locally
Pyrus calleryana cultivars 'Chanticleer', 'Ruby Glow', 'Bradford', 'Red Spire'	self-shaping, low maintenance, drought tolerant, quick growing, colourful, hardy, ornamental, smaller size than straight species
Pyrus ussuriensis	smallish tree, good colour
Quercus coccinea	hardy, fast-growing, limited root problems
Quercus ilex	long lived, suit local conditions (for larger areas only)
Quercus suber	long lived, suit local conditions (for larger areas only)
Santalum acuminatum	indigenous, small size for under powerlines
Sophora japonica	good canopy tree, adapted to climate
Ulmus parvifolia	disease resistant

Conclusions

There was tendency, especially in regional areas, to plant smaller, less conventional species of eucalypts and also to trial new cultivars of *Corymbia ficifolia.*

While some respondents were phasing out *Fraxinus griffithii,* three respondents were planning to plant more. One commented that it was only because the residents requested it, and the others because it 'appeared to be successful elsewhere'. This is where a forum like TREENET can be very helpful. Councils can access information about why existing plantings are being phased out, and therefore take a more informed and less conservative view than simply plant what other Councils have.

Several respondents cited expanding species used in TREENET trial sites which were showing promise.

Other new species to be introduced included several oaks - *Quercus coccinea, Q. ilex* and *Q. suber.* There was also interest in trialing new cultivars of *Pyrus calleryana.*

Several Councils indicated a move towards planting indigenous species because of their adaptability, long life, environmental benefits to wildlife, and the capacity to produce the specimens locally.

Q64 Number of full time staff involved in street tree maintenance and management (30 respondents)

Range 0.25 - 25 staff, average 5 - 6 staff

Q65 Type of training of staff involved in street tree maintenance and management (31 respondents, reported on 58 staff)

12% no training
5% specialist secondary
43% TAFE
5% University
19% private provider
16% other

The most commonly held qualification by Council respondents were TAFE qualifications in horticulture. Of the intended training of staff, nearly half will be TAFE based with another fifth through private providers. With representative os the secondary schools, TAFEs and Universities on the TREENET Advisory Board, TREENET will promote strong links between the education and training and other sectors of the tree industry.

Q66 Street tree staff numbers changing (32 respondents)

9% increasing
84% static
6% decreasing

Q67 Membership of relevant professional bodies (7 respondents)

Respondents were asked if they or any of their staff were members of 7 listed professional bodies or any others. The number of memberships are given.

1 International Society of Arboriculture (Aust. Chapt)
4 South Australian Society of Arboriculture
5 Australian Institute of Horticulture
2 Institute of Engineering
2 Australian Institute of Landscape Architects
1 Landscape Association of SA
1 Nursery & Landscape Industry Association of SA
1 PLA
1 National Arborists Association
1 Local Government Resources Association
1 Arboricultural Association

Q68 If membership of these associations were considered a benefit to the department
(21 respondents)

72% yes
28% no

*Q69 Training of tree maintenance staff intended or desired in the near future (*30 respondents)

90% yes
10% no

Q70 If so, what type of training (27 respondents reporting on 39 staff)

Respondents were given five categories from which to choose. The percentages in each category were as follows.

nil specialist secondary
44% TAFE
nil university
36% private provider
20% other

Section E. Suppliers / contractors / contracts

The following results are compiled from each respondent. The % of respondents purchasing trees in a specific category can be calculated, and the % of their stock purchased in that category can be recorded, but without absolute figures from each respondent about the actual number of trees in each category, it is not possible to properly assess the broader picture. Eg a small Council might purchase 100% of its stock in the 3 - 4 m category, but only purchase a total of 50 trees per year. A large Council might purchase only 5% of its stock in this range, but it if plants 10,000 trees overall, it would have a greater impact on the advanced tree market, purchasing 10 times the number of advanced trees than the first Council. Since the actual number or % of trees in each category cannot be calculated, only indications can be surmised.

Q71 Source of street tree stock (29 respondents)

Respondents were asked to assess the source of their street tree stock as a percentage of four different categories:

(1) own nursery facilities
(2) SA suppliers
(3) interstate suppliers
(4) other eg Trees for Life, Greening Australia

The results are given in Table 16.

67% of respondents used their own nursery facilities for at least some of their stock. Range 2 - 100 %, average 21% of stock. 10% used their own facilities for 90% or more of their stock.

100% of respondents used SA suppliers for at least some of their stock. Range 5 - 100%, average 73% of stock. 55% used SA suppliers for 90% or more of their stock.

33% of respondents used interstate suppliers. Range 5 - 100%, average 6% of stock.

It is most important to note that many councils are unaware of the fact that the ultimate source of their trees is from interstate *via* their South Australian supplier. Comparison of the number of trees planted annually and the value of trees produced in SA as cited in the nursery survey ($1.1m) supports the contention that the street tree market in SA is significant to suppliers from other states.

23% of respondents used Trees for Life, Greening Australia or some other supplier of trees. Range 2 - 50%, average 4% of their stock. Those respondents using 20% or more supplied from this category were regional councils.

Table 16. Sources of street tree stock

			own trees		SA Supply		Interstate Supply		Other	
	P/ahead yrs	plantings	%	#	%	#	%	#	%	#
1	2	-	2%	-	85%	-	13%	-	0%	-
2	1	-	5%	-	90%	-	5%	-	0%	-
3	1	-	5%	-	90%	-	5%	-	0%	-
4	3	3600	0%	0	25%	900	75%	2700	0%	0
5	1	700	0%	0	100%	700	0%	0	0%	0
6	1	500	35%	175	15%	75	0%	0	50%	250
7	1	200	50%	100	30%	60	0%	0	20%	40
8	1	200	0%	0	100%	200	0%	0	0%	0
9	1	15	10%	1.5	90%	13.5	0%	0	0%	0
10	3	150	0%	0	100%	150	0%	0	0%	0
11	-	-	-	-	-	-	-	-	-	-
12	-	-	0%	-	100%	-	0%	-	-	-
13	1	-	0%	-	100%	-	0%	-	0%	-
14	3	2400	70%	1680	10%	240	15%	360	5%	120
15	3	4500	0%	0	95%	4275	5%	225	0%	0
16	3	3500	50%	1750	50%	1750	0%	0	0%	0
17	1	300	-	-	-	-	-	-	-	-
18	-	-	-	-	-	-	-	-	-	-
19	1	-	0%	-	70%	-	5%	-	25%	-
20	1	1000	0%	0	90%	900	10%	100	0%	0
21	0.8	1000	-	-	-	-	-	-	-	-
22	2	1000	95%	950	5%	50	0%	0	0%	0
23	1	1000	8%	80	90%	900	0%	0	2%	20
24	1	70	10%	7	90%	63	0%	0	0%	0
25	5	-	10%	-	90%	-	0%	-	0%	-
26	1	-	20%	-	80%	-	0%	-	0%	-
27	2	300	10%	30	90%	270	0%	0	0%	0
28	-		100%	0	0%	-	0%	0	0%	0
29	1	100	-	-	-	-	-	-	-	-
30	1	100	0%	0	100%	100	0%	0	0%	0
31	-	-	0%	-	100%	-	0%	-	0%	-
32	1	2500	2%	50	70%	1750	28%	700	0%	0
33	1	-	90%	-	5%	-	0%	-	5%	-
avg	1.6	1157	20%	268	70%	729	6%	227	4%	24

Conclusions

Based on % stock, rather than actual numbers, indications are that at present the Nursery Industry provides approximately 76% of all street trees. About 20% of street trees are produced within Councils' own nursery facilities, and the rest are obtained through organisations such as Trees for Life (around 4%)

Q72 Likelihood of sources of their street trees changing in the near future? (30 respondents)

17% yes
83% no
Commentary

From this response it is safe to conclude that the Nursery Industry will continue to be the major supplier of trees into this market.

Q73 If sources of street trees are changing in the near future what changes are being made (5 respondents)

Reasons given included:

- Propagating through Trees for Life (1 respondent)
- Establishment or further expansion of Council nursery (3 respondents)
- Larger stock now being used, previously tube or bag (1 respondent)

Conclusions

Several Councils will be using their own or free sources of trees more. Only one respondent indicated a change to purchasing more advanced trees. However, the status quo of the Nursery Industry's significance remains.

Q74 Tree product type purchased during the last planting year (26 respondents)

Respondents were asked to indicate % of each product type planted during the last year. Four choices were given:

(1) bare root
(2) container grown
(3) ball burlap
(4) other.

The results are given in Table 17.

65% of respondents purchased at least some bare root stock.
Range 0 - 100%, average 17% of stock

88% of respondents purchased at least some container stock.
Range 0 - 100%, average 80% of stock

15% of respondents purchased at least some burlap stock.
Range 0 - 30%, average 2% of stock.

Conclusions

Based on respondents % given, of the 76% of stock coming from the Nursery Industry, 80% are container grown, 17-18% are bare root and 2% are ball burlap.

Table 17
Production method of tree stock

Council	# trees planted	bare-root		container		burlap	
		#	%	#	%	#	%
1	-	-	0%	-	70%	-	30%
2	-	-	10%	-	90%	-	0%
3	-	-	5%	-	95%	-	0%
4	3600	1800	50%	1800	50%	0	0%
5	700	-	-	-	-	-	-
6	500	0	0%	500	100%	0	0%
7	200	-	-	-	-	-	-
8	200	0	0%	200	100%	0	0%
9	15	0	0%	15	100%	0	0%
10	150	150	100%	0	0%	0	0%
11	-	-	-	-	-	-	-
12	-	-	-	-	-	-	-
13	-	-	0%	-	100%	-	0%
14	2400	240	10%	1920	80%	240	10%
15	4500	675	15%	3825	85%	0	0%
16	3500	1050	30%	1925	55%	525	15%
17	300	300	100%	0	0%	0	0%
18	-	-	-	-	-	-	-
19	-	-	0%	-	100%	-	0%
20	1000	400	40%	600	60%	0	0%
21	1000	0	0%	1000	100%	0	0%
22	1000	50	5%	950	95%	0	0%
23	1000	0	0%	1000	100%	0	0%
24	70	0	0%	70	100%	0	0%
25	-	-	10%	-	80%	-	0%
26	-	-	0%	-	100%	-	0%
27	300	-	-	-	-	-	-
28	-	-	-	-	-	-	-
29	100	20	20%	80	80%	0	0%
30	100	5	5%	95	95%	0	0%
31	-	-	10%	-	90%	-	0%
32	2500	1000	40%	1450	58%	50	2%
33	-	-	0%	-	100%	-	0%
av.	1157	335	17%	908	80%	48	2%

Q75 Type and size of planting stock planted in the last year (27 respondents)

Respondents were asked to give the % deciduous vs evergreen trees planted
Deciduous trees Range 0 -100%, average 34%
Evergreen Range 1 - 100%, evergreen 66%

Respondents were also asked to assign a % to each of seven height classes. The % assigned to each class is given in Table 18

Table 18
Type and size of planting stock

Council	% Deciduous	% Evergreen	Less than 1m	1-1.5m	1.5-2m	2-2.5m	2.5-3m	3-4m	4m +
1	90%	10%	0%	0%	0%	45%	40%	10%	5%
2	80%	20%							
3	20%	80%	70%	0%	0%	30%	0%	0%	0%
4	50%	50%	0%	0%	0%	0%	75%	25%	0%
5	40%	60%	0%	80%	20%	0%	0%	0%	0%
6	0%	100%	85%	15%	0%	0%	0%	0%	0%
7	2%	98%	100%	0%	0%	0%	0%	0%	0%
8	0%	100%	100%	0%	0%	0%	0%	0%	0%
9	0%	100%	100%	0%	0%	0%	0%	0%	0%
10	10%	90%	0%	0%	40%	40%	20%	0%	0%
11	-	-	-	-	-	-	-	-	-
12	-	-	-	-	-	-	-	-	-
13	-	-	-	-	-	-	-	-	-
14	50%	50%	0%	10%	5%	5%	70%	10%	0%
15	20%	80%	60%	40%	0%	0%	0%	0%	0%
16	60%	40%	0%	0%	0%	0%	30%	40%	30%
17	90%	10%	0%	100%	0%	0%	0%	0%	0%
18	-	-	-	-	-	-	-	-	-
19	30%	70%	60%	30%	6%	2%	2%	0%	0%
20	-	-	-	-	-	-	-	-	-
21	20%	80%	10%	50%	10%	15%	15%	0%	0%
22	15%	85%	0%	10%	80%	10%	0%	0%	0%
23	15%	85%	100%	0%	0%	0%	0%	0%	0%
24	10%	90%	70%	20%	0%	10%	0%	0%	0%
25	15%	85%	70%	20%	10%	0%	0%	0%	0%
26	0%	100%	0%	10%	0%	0%	0%	95%	0%
27	-	-	-	-	-	-	-	-	-
28	0%	100%	0%	0%	0%	100%	0%	0%	0%
29	60%	40%	40%	60%	0%	0%	0%	0%	0%
30	80%	20%	0%	50%	50%	0%	0%	0%	0%
31	100%	0%	0%	0%	100%	0%	0%	0%	0%
32	65%	35%	30%	25%	25%	18%	0%	0%	2%
33	0%	100%	90%	10%	0%	0%	0%	0%	0%
av.	34%	66%	38%	20%	13%	11%	10%	7%	1%

(1) < 1 m — 54% of respondents bought at least some stock this size. Range: 10 - 100% of their stock

(2) 1 - 1.5 m — 57% of respondents bought at least some stock this size. Range 10 - 100% of their stock

(3) 1.5 - 2 m — 34% of respondents bought at least some stock this size. Range 10 - 100% of their stock

(4) 2.- 2.5 m — 38% of respondents bought at least some stock this size. Range 2 - 100%

(5) 2.5 - 3 m — 27% of respondents bought at least some stock this size. Range 15 - 75% of their stock.

(6) 3 - 4 m — 19% of respondents bought at least some stock this size. Range 10 - 95% of their stock.

(7) 4+ m — 11% of respondents bought at least some stock this size. Range 2 - 30% of their stock

Conclusions

On average, respondents planted about one third deciduous and two thirds evergreen stock. A significant proportion of these trees were less than 1.5 m, with four respondents (all regional) indicating that 100% of their stock was in this category.

Q76 Source of planting labour (31 respondents)

Respondents were asked to indicate the % of each of three sources of planting and maintenance labour during the establishment of new trees:

89% of respondents used their own staff for at least some labour. Range of use 0 - 100%, average 89% 16 respondents used their own staff exclusively.

14% of respondents used outside contractors for some labour. Range of use 0 - 10%, average 6%

42% of respondents used volunteers for some labour. Range 0 - 100%, average 37%. Two respondents used volunteers exclusively.

Q77 Source of labour after establishment (30 respondents)

Respondents were asked to indicate the % source of labour after establishment. A choice of 5 categories were given.

100% of respondents used their own staff for some labour. Range of use 35 - 100%, average 87%

27% of respondents used general contractors for some labour. Range of use 1 - 10%, average 7%

30% of respondents used qualified arborists for some labour. Range of use 1 - 25%, average 8%

17% of respondents used other professionals / consultants for some labour. Range 5 - 55%, average 18%

33% of respondents used volunteers for some labour. Range 1 - 100%, average 29%

Q78 Change in percentage of contract work (29 respondents)

10% of respondents indicated an increasing % of contract work
83% static
7% decreasing

Q79 Quality of tree contract work (22 respondents)

Respondents were asked to rank the quality of work done by contractors on a scale of 1 (very unsatisfactory) to 5 (very satisfactory)

Average ranking 3.7.

9% very unsatisfactory
9% unsatisfactory
18% neutral
46% satisfactory
18 very satisfactory

Q80 Satisfaction with relationships with other bodies involved with street trees.

Respondents were asked to rate their satisfaction with their relationships with other bodies involved in street trees from 1 (very unsatisfactory) to 5 (very satisfactory). The % responses in each category follows.

(1) ETSA (Electricity provider) (31 respondents)
nil very unsatisfactory
19% unsatisfactory
29% neutral
42% satisfactory
10% very satisfactory

(2) SA Water (30 respondents)
nil very unsatisfactory
20% unsatisfactory
37% neutral
37% satisfactory
6% very satisfactory

(3) Telstra (26 respondents)
nil very unsatisfactory
19% unsatisfactory
46% neutral

31% satisfactory
4% very satisfactory

(4) Catchment Boards (10 respondents)
nil very unsatisfactory
nil unsatisfactory
40% neutral
50% satisfactory
10% very satisfactory

(5) Transport SA (23 respondents)
9% very unsatisfactory
4% unsatisfactory
31% neutral
52% satisfactory
4% very satisfactory

(6) National Trust (8 respondents)
nil very unsatisfactory
25% unsatisfactory
25% neutral
38% satisfactory
12% very satisfactory

(7) Heritage groups (9 respondents)
nil very unsatisfactory
nil unsatisfactory
56% neutral
33% satisfactory
11% very satisfactory

Conclusions

Councils expressed no dissatisfaction with Catchment Boards or Heritage Groups. Relationships with the other groups were seen to be less than satisfactory in a substantial proportion of cases and clearly there is scope for improvement here. TREENET aims to be able to assist by providing a forum for representatives of the different the authorities and Councils to exchange information, improve understanding and work together on street tree issues.

Section F. Community involvement

Q81 Importance of resident contribution to establishment and maintenance of street trees (31 respondents)

Average rating 4.1

nil unimportant
3% slightly important

26% somewhat important
26% important
45% very important

Q82 Is this importance changing? (31 respondents)

45% increasing
48% static
6% decreasing

Q83 Tree related community groups active in the area? (31 respondents)

74% yes
26% no

Q84 Level of satisfaction of Councils with these groups (23 respondents)

Average rating 4.1

nil very unsatisfactory
5% satisfactory
18% neutral
34% satisfactory
43% very satisfactory

The majority of Councils had a satisfactory or better relationship with community groups in their area, and this is also reflected in the use of volunteers for planting trees, especially in regional areas.

Q85 Influence of the community in the selection of street trees (30 respondents)

Respondents were asked to rate the influence of the community in the selection of street trees in their area.

Average rating 3.0

3% uninfluential
20% slightly influential
50% somewhat influential
20% influential
7% very influential

Q86 Satisfaction with the level of community influence in the selection of trees process (30 respondents)

Average rating 4.1

nil very unsatisfied
13% unsatisfied

57% neutral
23% satisfied
7% very satisfied

Q87 Importance of issues in the community according to resident complaints / inquiries / feedback (32 respondents)

Respondents were asked to rate the importance of issues on a scale of 1 (unimportant) to 5 (very important). A given rating could be applied to more than one issue. Table 19 summarises the results. Not every respondent gave a rating to every category, but each issue was scored by at least 29 respondents. Percentages were calculated on the basis of the number of respondents for that issue.

Table 19
The importance of different street tree issues in the community, based on resident complaints, inquiries and feedback

Issue	% of respondents indicating				
	very important	important	somewhat important	slightly important	unimportant
Rates	40	40	7	10	3
Garbage collection	42	32	10	13	3
Planning	10	33	37	17	3
Street trees issues	16	19	40	22	3
Path / road maintenance	36	39	19	3	3
Pollution	9	9	41	28	13
Services (library etc.)	7	27	37	23	6
Security	7	7	52	31	3

Conclusions

The three issues perceived to be the most important to the community, based on residents' complaints, inquiries are feedback were in order:

- Rates (80% respondents rated this important or very important)
- Footpath / road maintenance (75% respondents rated this important or very important)
- Garbage collection (74% respondents rated this important or very important)

Street tree issues were rated important or very important by only 35% of respondents, less important than planning (43%) and comparable with services (34%). Security (14%) and pollution (18%) were considered least important issues to the community.

Section G. Media coverage & public image

Q88 Satisfaction with coverage of tree related issues by the media (28 respondents)

Respondents were asked to rate their satisfaction with coverage of tree related issues by the media on a scale of 1 (very unsatisfactory) to 5 (very satisfactory). The % response in each category follows.

Average rating 2.5.

3% very satisfactory
14% satisfactory
49% neutral
24% unsatisfactory
10% very unsatisfactory

Conclusions

83% of respondents indicated that coverage of tree related issues by the media was less than satisfactory. Clearly there is a lot of scope for improvement of communication between the media and Local Government on tree related issues.

Q89 Issue of press releases or publication of initiatives (32 respondents)

Respondents were asked if they issued press releases or published their initiatives in any way.

47% no
53% yes

Conclusions

Issuing of press releases or publication of initiatives is an important way of improving communication, but is practised by just over half of the respondents. TREENET has a role in promoting better communication between the media and all the different stakeholders in tree related matters including Local Government and service providers, so that media coverage is well informed and balanced.

Q90 Resultant media coverage (21 respondents)

Respondents were asked to indicate whether coverage from press releases was positive, mixed or negative.

19% positive
71% mixed
10% negative

Section H TREENET

Q91 Role of TREENET in Councils' street tree management policy (32 respondents)

Respondents were asked to indicate whether or not they thought TREENET has a role to play in their street tree management policies.

91% yes
9% no

Q92 If yes to Q91, areas in which TREENET input would be sought (29 respondents)

48% respondents would seek input into species selection (more suitable species)

34% respondents would seek information about new species (ie not currently used by them or new introductions)

34% respondents would seek input on best practice and improved planting, establishment, maintenance (including watering efficiency) and management techniques

10% respondents would seek assistance in relation to guidelines of electricity and other authorities including how to comply or alternatively how to get around them.

7% respondents would seek TREENET's input into promoting better quality trees for consumers

7% respondents would seek input to develop better planning and development policies.

7% respondents would like to see TREENET have role in promoting cross-Council standards, and dissemination of information about other Councils.

Other forms of input cited by one respondent included:
Training and research
Financial assistance
Publicity and public involvement
Support for initiatives / association with TREENET name seen as a benefit.

Conclusions

Providing information that assists Councils to select the right species to meet their requirements and conditions and informing them of new cultivars and alternative species to the ones usually planted, are very important services to be offered, with 82% of respondents indicating they would seek TREENET's input in these areas.

The other main area in which Councils would seek input from TREENET related to best practice and improved planting, establishment, maintenance (including watering efficiency) and management techniques.

Q93 Interest in setting up a TREENET monitored species trial? (31 respondents)

84% yes
16% no

The very strong interest indicated by Councils in establishing TREENET trials is indicative of the need to test the suitability of previously untried species and new cultivars in their particular conditions and to monitor and share that information.

Q94 Interest in attending a TREENET symposium at the Waite Arboretum, Adelaide University (31 respondents)

94% yes
6% no

Q95 If yes, probable numbers of delegates to symposium? (29 respondents)

Range of delegates 1 - 7, average 2

Q96 Wish to be kept up to date on new TREENET programs and developments (32% respondents)

All respondents indicated in the affirmative.

6 DISCUSSION

6.1 Nursery Industry and future prospects

All respondents have a positive outlook regarding the future of the urban tree market in South Australia. In fact most saw the street tree market as national rather than local, as the generally under supplied demand in the eastern States created buyer interest in South Australia.

Assisting the interest in South Australian produced stock are the generally lower prices and competitive back-load freight rates. As elsewhere South Australian nurseries are becoming accessible on-line and interstate trade is long standing and non threatening business routine. However, S. A. nurseries have not been generators of new varieties, with notable exceptions being *Fraxinus rotundifolia* 'Raywood' Claret Ash and *Eucalyptus leucoxylon* varieties. S. A. nurseries have mostly copied trends and produced the same varieties which appeared several years earlier in other states, in the hope that demand from local buyers would follow. This conservative approach is not always successful as can be seen by the recently fashionable use of *Fraxinus*

griffithii in Adelaide as a street tree at the same time that it is proving a problem in other cities due to invasion of watercourses.

The five nurseries were unanimous in recognising TREENET as a key contributor to their future success in business. During an industry workshop, they identified species trialing and the development of closer relationships with stakeholders in street tree issues as the principal benefits of TREENET. They supported this project with funding and continue to attend TREENET field days and seminars.

6.2 Local Government survey

Species selection

There is a perceived need to broaden the palette of species used as street trees. Many Councils expressed an interest in establishing trial sites facilitated and coordinated by TREENET. Trial sites have been established in a number of Councils to date and so far they have shown promise.

While many Councils are phasing out eucalypts, especially mallees and W.A. species, other Councils are planning to plant more indigenous species because of their suitability to local conditions, long-life and environmental benefits to wildlife. However, there is a great need to improve native species with selection for good form, such as the research currently being conducted at Burnley College, Melbourne University on *Corymbia maculata*. Interest was also expressed in trying named eucalypts selections e.g. *Corymbia ficifolia* cultivars which have spectacular flower colour and *Eucalyptus leucoxylon* 'Euky Dwarf' which is of a more appropriate size.

There is also a willingness by some S.A. Councils to try other Australian species such as *Elaeocarpus* spp., *Flindersia australis*, *Cassia brewsteri*, *Cupaniopsis anacardioides* and *Buckinghamia celsissima*. These species have proved successful in the eastern States or have proven hardy in the Waite Arboretum.

Similarly, there is scope for better selection of introduced species, producing cultivars suitable for the hot, dry summer climate of much of South Australia, rather than accepting cultivars developed interstate and overseas with different cultural requirements. The Nursery Industry has an important role to play in the development of new selections.

It was instructive to note which species Councils are phasing out and why - providing useful feedback to the Nursery Industry.

Role of TREENET

In assessing factors influencing the success of planting programs, more than half of the responding Councils ranked the availability / quality of information on suitable species as the most important.

TREENET is developing a central role as a national body for coordinating and disseminating information. The national database being established will include cultural, edaphic and climatic information relevant to the production, establishment and maintenance of street trees, thereby facilitating more informed species selection for any given situation. Information is shared through the TREENET web site, at the annual symposium, and through industry workshops and field days.

Liability and risk management

Under the Local Government Act (1999), Section 245 of the Act places liability from property damage on Councils for the trees which they have been notified are a hazard.

Infrastructure damage especially to roads, footpaths and kerbs, emerged as the main reason responding Councils were dissatisfied with existing plantings and one of the most common reasons given for phasing out the offending species. 58% of responding Councils indicated paving damage causing tripping hazard was one of the main three reasons for personal injury (equal to tree litter / slippery paths).

Ironically, while displacement of kerbs and paths by roots was identified as significant and widespread problem, root pruning and root barriers did not feature highly in hazard reduction practices of Councils. There will be increasing pressure on the Nursery Industry to diversify into tree species with low impact root systems and move away from known problem species like *Fraxinus*.

Outcomes of the survey

Customer needs and expectations identified by this pilot Local Government survey will help tree growers in their forward planning to better meet those needs.

Of particular interest is that the factors most influential on the success of planting programs were those relating to the Nursery Industry, such as availability and quality of stock and information available on the performance of different species.

Nurseries will be able to diversify their stock and produce trees which have been demonstrated to be successful through TREENET trials, both in the Waite Arboretum and in the urban street environment.

Involving tree growers in the street trials provides opportunities for growers to influence their consumers, by offering them new species for testing.

The results of these pilot surveys will be of use not only to the Nursery Industry and Councils, but also to landscape architects, urban planners, tree training providers and arborists.

Benefits to Local Government will be better information for species selection, better quality of stock, closer liaison with producers, lower maintenance costs, reduced infrastructure damage and less exposure to litigation.

7. TECHNOLOGY TRANSFER

7.1 Annual TREENET symposia

TREENET holds an annual symposium on street tree issues on the first Thursday in September each year at the Waite Campus of Adelaide University.

Nursery Industry specific topics and activities will be included in the TREENET 2001 Symposium program (Attachment C) as a result of our Nursery Industry Survey, but significantly a Nursery Industry workshop will be conducted by the Nursery Industry Development Officer and TREENET Board member, Anne Frodsham. This will allow ongoing dialogue between the Nursery Industry and TREENET and identify important areas of research (such as the affect of container design on root production) relevant to the industry.

Finally the expression of interest by the five respondents in identifying new varieties for street trees will be recognised during the symposium as Dr David Symon, former curator of the Waite Arboretum will be demonstrating his work on *Pyrus* varieties and planting an example of his *Pyrus* 'Lynington' recently released to the industry (Freshfords Nursery).

7.2 TREENET Website

The developing TREENET website www.treenet.com.au and database are recognised as a very important educational, research, and marketing tools and are to be presented to the Nursery Industry during the 2001 symposium.

The promotional web site now in place outlines the aims of TREENET and enables on line registration for the symposium. The web site also enables Councils to register their interest in participating in trial sites and informs them of the protocols and responsibilities.

As the database is being established, there will be opportunity for participants to provide feedback, on-line, on the way they would like to see the database develop. Once fully established, participating Councils will be able to enter their trial site data on-line. Summary information on street tree performance will be generated, and the information made freely available on the Internet, searchable by a number of fields including species, climate and edaphic information, location of trial sites etc. Trials sites will not only include new plantings, but established plantings which have

proved successful over time will be added and so that the information is made accessible.

The website will also provide useful links to other sites eg Waite Arboretum, participating Councils, Horticulture Australia, and Nursery and Garden Industry SA.

7.3 TREENET presentations

Both authors of this report have made presentations at the annual TREENET symposia and to community groups. A display booth was mounted at the International Society of Arboriculture (Australian Chapter) third national conference in Brisbane in October 2000 and at an Arboriculture camp in Melbourne in March 2001.

8. RECOMMENDATIONS

These pilot surveys served to provide an overview on broad range of issues relevant to both street tree producers and customers. The pilot surveys were limited to advanced tree growers and Local Governments in South Australia.

It is recommended that a national survey be undertaken, informed by the pilot surveys and based around the key issues which emerged in the results. Future surveys will be shorter, more focussed, with more specific questions. Responses will be entered on-line and automatically processed. Analysis of the results will be more sophisticated and informative. Results would be available for immediate dissemination and feedback.

A national survey would be open to more than 700 Councils. Other groups could be targeted e.g. professional arborists, surveys of which would provide very useful feedback to the Nursery Industry, Councils and service providers.

TREENET is a work in progress and will seek ongoing support from HRDC.

ACKNOWLEDGMENTS

Tim Johnson from the City of West Torrens and members of the TREENET Advisory Board contributed ideas and gave valuable feedback regarding the survey questions.

Gareth Hodges assisted with the preparation, dissemination and collation of the Local Government Survey as part of a one year postgraduate scholarship supported by TREENET.

Sean Donaghy assisted with the preparation of the tables and compilation of this report.

ATTACHMENT A: TREENET ADVISORY BOARD

PRINCIPAL INSTITUTION:	Adelaide University
Executive Officer:	Dr Jennifer Gardner, Waite Arboretum
AFFILIATED INSTITUTIONS:	University of Melbourne - Burnley Ryde College of TAFE, NSW

The Board comprises members who provide advice in their areas of expertise and liaise with the groups they represent to input ideas and facilitate the two-way flow of information and implementation of projects. The areas they represent include: secondary and tertiary education; nursery, arboriculture and landscape industries; landscape architecture; State and Local Government and the horticultural media.

David Lawry (Chair)	Director, Lawrys Nursery
Mark Adams	Landscape Architect, Transport SA; Graduate of UAHS, Burnley, Uni. NSW.
Malcolm Campbell	Television and radio presenter Horticultural Media Association (Founder & Past President)
Andrew Ciric	Civil Engineer, Manager Technical Services, City of Mitcham
Dean Cresswell	Deputy Principal, Urrbrae Agricultural High School
Judy Fakes	Senior Lecturer, Ryde College of TAFE, NSW
Anne Frodsham	SA Nursery Industry Development Officer , Nursery and Garden Industry South Australia Inc. / SARDI
Dr Jennifer Gardner	Curator, The Waite Arboretum, Adelaide University
Kevin Handreck	Netherwood Horticultural Consultants, Soil Scientist
Tim Johnson	Technical Officer, City of West Torrens - Park & Gardens
Dr David Jones	Senior Lecturer, Landscape Architecture, Adelaide University
Kym Knight	Arborist, Contract lecturer at TAFE; Exec. Committee International Soc. Arboriculture - Aust. Chapt, Exec. Committee, South Aust. Soc. Arboriculture
Dr Greg Moore	Principal, Burnley College, University of Melbourne Past President, International Soc. of Arboriculture - Aust. Chapt.
Trevor Nottle	Manager - Education, TAFE Horticulture Centre at Urrbrae, Garden Historian, Garden Writer, Designer, Consultant
Henry Polec	Senior Landscape Architect, Transport SA
Dr Randy Stringer	Deputy Director, Centre for International Economic Studies, School of Economics, Adelaide University

If any of the following questions are either irrelevant, or would require you to divulge information considered confidential by your organisation, please put a line through the question number and proceed to the next question.
[Please note: Where a Rating from 1-5 is requested, please fill in the box with the appropriate number, where 1 indicates strong disagreement or a strongly negative response, 2 is moderately negative, 3 is average or satisfactory, 4 is a moderately positive response and 5 is a strongly positive response.]

Survey respondent details:

1. Name of Local Government Authority:

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2. Title of Department responsible for street trees:

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3. Name of nominated respondent:

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4. Contact Details of nominated respondent:

Telephone:_____
Mobile No.:_____
Fax: _____
Email: _____

5. Job Title:

---

6. Qualifications:

---

7. Length of time in current position: _____years

8. Length of time with current Local Government Authority: _____years

9. Membership(s) with relevant organisations (Please List):

Organisation:_____
Organisation:_____
Organisation:_____

10. Have you previously attended a conference related to urban trees? Yes ☐ No ☐

Local Authority details

This section is optional based on available information

11. Total population within Local Government area:

12. Total area under Local Government authority: _____sq.km

13. Total length of urban roadways in Local Government area under Council control: _____km

14. Total length of urban roadways in Local Government area under TransportSA control: _____km

15. Total length of roadways with overhead powerlines: _____km

16. Types of cabling in Local Government area (%):

i) Aerial Bundling _____%
ii) High Voltage _____%
iii) Underground _____%
iv) Other (Please describe)_____ _____%

Operations

17. Please state the Annual Budget for street tree expenditure to nearest $100K (Or exact figure if possible): $_____

18. Is the budget for street trees (Tick One):

i) Increasing? ☐
ii) Static? ☐
iii) Decreasing? ☐

19. Do you believe the current street tree budget is(Tick One):

i) Inadequate? ☐
ii) Adequate? ☐
iii) Excessive? ☐

20. Do you receive any external funding for your street tree program? Yes ☐ No ☐

21. If so, from what source(s) does this funding come?

_____

22. What % of the department's budget is set aside for education & training? _____%

23. What % of the budget is set aside for contractors/consultants? _____%

24. In your department, estimate the % of overall work hours spent on street trees: _____%

25. What are the current estimated costs per tree for the first 3 years of establishment for:

i)	Tree purchase	$_____
ii)	Planting materials, fertilizer	$_____
iii)	Labour	$_____
iv)	Maintenance – watering	$_____
v)	Maintenance – staking, formative pruning	$_____
vi)	Maintenance – weed, pest & disease control	$_____
vii)	Tree Protection	$_____
viii)	Administration	$_____
	Total costs:	$_____

26. Rate each of the following factors as to their influence on the success of planting programs
(1: Uninfluential, through to 5: Very Influential)

i)	Availability/quality of information on suitable species		☐
ii)	Availability/quality of Nursery stock		☐
iii)	Difficult site conditions:		
	i)	High heat loads/radiant heat	☐
	ii)	Compacted/poorly draining soils	☐
	iii)	Disturbed profiles	☐
	iv)	Polluted soils/extreme pH	☐
	v)	Limited soil volume	☐
	vi)	Other (Nominate):_____	☐
iv)	Availability of funds		☐
v)	Availability of Human resources		☐
vi)	Access to specialist knowledge/skills		☐
vii)	Vandalism		☐

27. Rate your satisfaction with the street trees existing prior to your involvement:
(1: Very Unsatisfied, through to 5: Very Satisfied) ☐

28. Please indicate any factors which influenced your response to Question 27 (Tick where appropriate):

i)	Incorrect cultivation requirements	☐
ii)	Poor condition	☐
iii)	High maintenance requirements	☐
iv)	Litigation risk/liability issues	☐
v)	Infrastructure damage	☐
vi)	Too few trees	☐
vii)	Too many trees	☐

29. Rate the significance of each of the following reasons for personal injury caused by your street trees:

(1: Not significant, through to 5: Very significant)

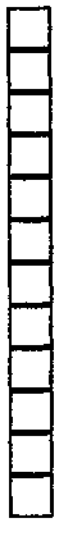
i) Limb fall
ii) Eye-level foliage/branches
iii) Blocked line-of-sight
i) Litter – slippery paths
ii) Respiratory irritation
iii) Paving damage causing tripping
iv) Poisoning

30. Rate the significance of each of the following reasons for property damage caused by your street trees:
(1: Not significant, through to 5: Very significant)

i) Limb fall
ii) Root invasion of pipes/drains
iii) Building settlement
iv) Trees blown over
v) Litter/sap
vi) Displacement of kerbs/paths/roadway
vii) Vehicle impact

31. Rate each of the following hazard reduction practices for the frequency of use in your area
(1:Never used, 3: Used Occasionally where possible, 5: Used immediately as required)

i) Whole limb removal
ii) Crown lifting
iii) Crown reduction
iv) Cabling or bracing
v) Removal of one codominant stem
vi) Dead wooding
vii) Drop crotching
viii) Included bark (limb) removal
ix) Root pruning
x) Installation of root barrier
xi) Litter removal
xii) Regular tree assessment



32. What recycling practices do you have for tree debris for:
i) Leaf litter (Routine debris)

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ii) From pruning and other tree operations

---

33. Do you keep a systematic listing of maintenance operators on each tree or street, either individuals or groups? Yes ☐ No ☐

Current tree statistics/data recording:

34. Do you have a tree inventory? Yes ☐ No ☐

35. If not, do you intend to conduct one? Yes ☐ No ☐

36. What is the approximate number of urban street trees in your Council area?

_____trees

37. Please estimate the age distribution of urban street trees in your Council area (%):

i)	Less than 5 years	_____%
ii)	5-9 years	_____%
iii)	10-19 years	_____%
iv)	20-49 years	_____%
v)	50-80 years	_____%
vi)	>80 years	_____%

38. Please list the 10 most common species of tree planted in your urban streets, from most to least common:

1)_____
2)_____
3)_____
4)_____
5)_____
6)_____
7)_____
8)_____
9)_____
10)_____

39. Please give an indication of the number of other species planted in your urban streets: _____species

40. Do you have a standardised data recording method for street trees? Yes ☐ No ☐

41. If No, would you be interested in participating in the development of a cross-council standard? Yes ☐ No ☐

42. If Yes to Question 40, Is this information part of a public document? Yes ☐ No ☐

43. If so, can we have a copy? Yes ☐ No ☐

44. Is the tree data computerised? Yes ☐ No ☐

45. If so, do you use special tree management software? Yes ☐ No ☐

46. How often is this software updated? _____years

47. What special environmental conditions apply to your area e.g. coastal, arid, saline soil etc?

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48. What is the estimated % of mortality during the first Three years in newly planted trees? _____%

49. Is this figure (Tick One):

i) Increasing? ☐
ii) Static? ☐
iii) Decreasing? ☐

Policy & Planning:

50. Do you have a Tree Management Policy? Yes ☐ No ☐

51. If not, do you intend to produce one? Yes ☐ No ☐

52. Is it a public document? Yes ☐ No ☐

53. If so, could we have a copy or excerpt? Yes ☐ No ☐

54. Is it a stand-alone document or part of a larger document?
(e.g. Environmental Policy, Parks & Gardens Policy, Strategic/Corporate Plan etc?)
Stand Alone: ☐ Part of larger document: ☐

55. Is it available/used in other areas of Council as a reference?
(E.g. do Planning/Development services refer to it when making planning/zoning decisions?) Yes ☐ No ☐

56. How often is it updated? _____years

57. What is the perceived role of street trees in you community:
i) By the Council?

---

ii) By ratepayers?

---

58. Are you satisfied with the current range of species available for street planting? Yes ☐ No ☐

59. Would you plant new species of street tree if they were offered for trialing? Yes ☐ No ☐

60. How far ahead are plantings planned? _____years

61. What number of trees are planned for plantings over this period? _____trees

62. What species are you planning to phase out during this period, and why? (Please provide a separate list if space is insufficient)

Species:_____
Reason:_____

Species:_____
Reason:_____

Species:_____
Reason:_____

Species:_____
Reason:_____

63. What species are you planning to introduce during this period, and why? (Please provide a separate list if space is insufficient)

Species:_____
Reason:_____

Species:_____
Reason:_____

Species:_____
Reason:_____

Species:_____
Reason:_____

Personnel:

64. Please indicate the number of equivalent full time staff involved with street tree maintenance and management: _____people

65. Please indicate the type of training represented by staff involved in street tree management & maintenance (Tick Where Appropriate):

i) None ☐
ii) Specialist secondary school e.g. Agricultural High School etc ☐
iii) TAFE ☐
iv) University ☐
v) Private provider (in house) ☐
vi) Other (Please describe)_____ ☐

66. Are street tree staff numbers (Tick One):

i) Increasing? ☐
ii) Static? ☐
iii) Decreasing? ☐

67. Are your staff members of any of the following relevant professional bodies? (Please tick where appropriate)

i) International Society of Arborists (Australian Chapter) ☐
ii) South Australian Society of Arboriculture ☐
iii) Australian Institute of Horticulture ☐
iv) Institute Of Engineering ☐
v) Australian Institute of Landscape Architects ☐
vi) Landscape Association of SA ☐
vii) Nursery & Landscape Industry Association of SA ☐
viii) Other (please list)_____ ☐

68. Is membership with any of these groups considered of benefit to the department? Yes ☐ No ☐

69. Is training of tree maintenance staff intended or desired for the near future? Yes ☐ No ☐

70. If so, which type(s) of training will be used? (Tick where Appropriate)

i) Specialist secondary school e.g. Agricultural High School etc ☐
ii) TAFE ☐
iii) University ☐
iv) Private provider (in house) ☐
v) Other (Please describe)_____ ☐

Suppliers/contractors/contacts:

71. Assess your source of street tree stock (%)

i) Own nursery facilities _____%
ii) SA suppliers (commercial) _____%
iii) Interstate suppliers (commercial) _____%
iv) Other e.g. Trees for Life, Greening Australia etc _____%

72. Is this likely to change significantly in the near future? Yes ☐ No ☐

73. If so, how & why?

_____

74. Assign a % to each of the following to reflect the tree product type planted in yor streets during the last planting year:

i) Bare root _____%
ii) Container grown _____%
iii) Ball Burlap _____%
iv) Other (Please specify) _____ _____%

75. Assign a % to each of the following to reflect the type & size of planting stock planted in your streets during the last planting year:

i) Deciduous ☐
ii) Evergreen ☐

i) Less than 1 m ☐
ii) 1 - 1.5 m ☐
iii) 1.5 - 2 m ☐
iv) 2 - 2.5 m ☐
v) 2.5 - 3 m ☐
vi) 3 - 4 m ☐
vii) Greater than 4.m ☐

76. Assess your source of planting & maintenance labour during establishment of new trees(%):

i) Own staff _____%
ii) Outside contractors _____%
iii) Volunteers _____%

77. Assess your source of labour after establishment (%):

i) Own staff _____%
ii) General contractors _____%
iii) Qualified arborists _____%
iv) Other professionals/consultants _____%
iv) Volunteers _____%

78. Is contract work in this area (Tick One):

i) Increasing? ☐
ii) Static? ☐
iii) Decreasing? ☐

79. Please rate your satisfaction with the quality of street tree contract work
(1: Very Unsatisfactory, through to 5: Very Satisfactory) ☐

80. Please rate your satisfaction with your relationship with other bodies involved with street trees:

i) ETSA ☐
ii) SA Water ☐

iii) Telstra ☐
iv) Catchment Board(s) (Indicate which)_____ ☐
v) Transport SA ☐
vi) National Trust ☐
vii) Heritage Groups ☐
viii) Other (Please indicate)_____ ☐

Community involvement:

81. Please rate the importance of resident contribution to the establishment and maintenance of your street trees:
(1:Unimportant, through to 5: Very Important) ☐

82. Is this importance (Tick one):

i) Increasing? ☐
ii) Static? ☐
iii) Decreasing? ☐

83. Are there any tree-related community groups active in the Council area? Yes ☐ No ☐

84. Please rate the level of satisfaction of Council with these groups:
(1: Very Unsatisfactory, through to 5: Very Satisfactory) ☐

85. Please rate the influence of the community in the selection of street trees:
(1: Uninfluential, through to 5: Very Influential) ☐

86. Rate your satisfaction with the level of community influence in the selection process:
(1: Very Unsatisfactory, through to 5: Very Satisfactory) ☐

87. Rate the importance of each of the following issues in your community according to resident complaints/inquiries/feedback
(1: Unimportant, through to 5: Very Important)

i) Rates ☐
ii) Garbage collection ☐
iii) Planning ☐
iv) Street tree issues ☐
v) Footpath/road maintenance ☐
vi) Pollution ☐
vii) Services (community centre, library etc) ☐
viii) Security ☐

Media coverage & public image:

88. Rate your satisfaction with coverage of tree related issues by media:
(1: Very Unsatisfactory, through to 5: Very Satisfactory) ☐

89. Do you issue press releases or publish your initiatives in any way? Yes ☐ No ☐

90. Do you feel the resultant coverage is(Tick One):

i) Positive ☐
ii) Mixed ☐
iii) Negative ☐

TREENET:

91. Do you believe TREENET has a role to play in your street tree management policy? Yes ☐ No ☐

92. If so, in what areas would you seek TREENET input?

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93. Are you interested in setting up a TREENET monitored species trial in your area? Yes ☐ No ☐

94. Would you be interested in attending the TREENET symposium at the Waite Arboretum in September this year? Yes ☐ No ☐

95. If so, how many people from your department/organisation would be likely to attend? _____

96. Would you like to be kept up to date on new TREENET programs and developments? Yes ☐ No ☐

ATTACHMENT C

TREENET SYMPOSIUM PROGRAM
6 - 7 SEPTEMBER 2001
ADELAIDE UNIVERSITY - WAITE CAMPUS

Thursday 6 September

8.30 - 9	Registration
9 - 9 .05	Welcome - **David Lawry** (5 mins)
9.05 - 9.50	Keynote address - **Judy Fakes** - Planting and establishment of street trees on difficult sites (45 mins)
9.50 - 10.30	**Tim Johnson** - How to set up and monitor a TREENET trial site (40 mins)
10.30 - 11.10 (40 mins)	Morning tea, trade displays and tree climbing demonstration - Urrbrae House and gardens
	Research papers
11.10- 11.50	**Derek Moore** (Ph.D. Thesis, Melb. Uni) - Nursery practices and the effectiveness of different containers on root development (40 mins)
11.50 - 12.10 street	**Sarah Bone** (Masters Thesis, Melb. Uni) - Provenance selection of *Corymbia maculata* for trees (20 mins)
12.10 - 12.40	**Aaron O'Malley** (Masters Thesis, Uni. SA) - Effects of street trees on soil moisture, urban dwellings and pavements and the establishment of Walkely Heights in the City of Salisbury as a TREENET research site. (30 mins)
12.40 - 1	Panel discussion
1 - 2 Arboretum	Lunch, displays, tree climbing and air spade demonstrations - Urrbrae House, gardens &
2 - 2.30	**Mark Adams** - Transport SA guidelines for median planting (30 mins)
2.30 - 3	**Neville Bonney** - Is there a place for Australian trees in our streets? (30 mins)
3 - 3.15	Panel discussion
3.15 - 3.45	Afternoon tea, trade displays - Urrbrae House & gardens (40 mins)
3.45 - 4.15	**Sean Donaghy** (TREENET) - Demonstration of the web site and on line database (30 mins
4 15- 4.45	**Dr Greg Moore** - wrap up and thoughts on the day's sessions
5 - 6	Happy Hour in Urrbrae House , display of wood crafted items from reclaimed street trees, tree climbing demonstration in the garden / Arboretum
6 - 8	Informal dinner in Urrbrae House by *Deliciously Different*

Friday 7 September

8.30 - 8.45 **Concurrent Workshops preliminary including overview of discussion topics** (15 mins)

8.45 - 9.45 **Workshops** (1 hour)

- Nursery Industry (Facilitator - **Anne Frodsham)**
- Local Government (Facilitator - **Tim Johnson)**

9.45 - 10.15 Morning tea , trade displays - Urrbrae House etc. (30 mins)

10.15 - 10.35 Joint session and reporting back on workshops (20 mins)

10.35 - 10.50 Wrap up of formal proceedings with Board available for questions (15 mins)

Adjourn to Waite Arboretum and other outdoor sites for demonstrations related to **Tree roots - morphology, physiology and development in urban infrastructure**

10.50 - 11.30 **Dr Greg Moore** - Natural root systems and tree protection zone - Waite Arboretum (40 mins)

11.30 - 12.30 **City of Mitcham** - Techniques to reduce root damage to infrastructure - Claremont Avenue (1 h)

- **Kym Knight** - Observation of *Fraxinus* root damage to infrastructure
- **Mick Gooden** - Use of root directors
- **Bradley Hay** - Installation of root barrier
- **David Lawry** - Innovative planting methods

Dr David Symon -
Demonstration of *Pyrus calleryana* selections, including planting of *Pyrus* 'Lynington' - Claremont Avenue

.12. 30 - 1.40 Lunch - Urrbrae House

1.40 - 1.45 Dr Jennifer Gardner - closing comments (5 mins)

1.45 - 3.45 **Optional activities** (~ 2 hours)

- Setting up your TREENET trial site (computer suite)
- Guided walk of Waite Arboretum (45 mins)
- Tree climbing demonstrations - participants in the SA Tree Climbing competition (8 April)
- Inspection of TAFE / Urrbrae High School horticultural facilities (State Horticulture Centre)