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APPENDIX 1

SHIRLEY BARNES AND ASSOCIATES - 1995 WIRELESS HILL SURVEY

REPORT ON 2ND STAGE OF SURVEY

OF

WIRELESS HILL PARK

(SEPTEMBER 1995)

FOR

THE CITY OF MELVILLE

BY

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This report is written as the second stage of the Wireless Hill Survey and targetted only people using the park, as residents adjacent to the park had been surveyed in March/April.

The decision was made not to circulate the questionnaires through the Council newsletter to all ratepayers as many residents probably do not use the area and a reasonable sample of information should be gained from park visitors. Up to 500 completed questionnaires was the target and if this figure was well short, then the Council newsletter would be used.

Bundles of questionnaires were given to 2 local tour companies for completion by passengers. However one did not actually visit the Park during September (scheduling October for Wildflower Season) and staff at the other thought forms were too complicated for their overseas visitors.

Questionnaires were distributed by on-site visits over every weekend in September, beginning on the Sunday 3 (Fathers' Day), which was believed to be a popular time (and was!). Spring time, during the wildflower season, was seen to be a good yardstick for use, and, therefore, for possibly the largest number of visitors during the year.

Visits were made on most Saturdays and Sundays, and during the week on different days and at different times (varying from mid morning to late afternoon) - 9 visits in all to distribute questionnaires, and 3 other times to monitor the usage of the area. The weather varied from fine, clear days to cool and windy with some rain. Apart from the distribution and collection of the questionnaires, head counts were made at intervals of the number of adults and children in the park and the number of vehicles in the car park. The final return of forms was 287, but many replies were completed on behalf of an entire group or family (up to 45), and a large number actually indicated this on their reply, so a base of 366 replies has been used.

It was very obvious that while many people take their young children for walks in the park and to the playground, the majority of visitors are adults - even for picnics and especially so on Fathers' Day. There is a very strong contingent of residents who take their children almost daily to the park and also picnic there with them on a fairly regular basis, especially during Spring and Summer. However, bus loads of senior citizens are taken there for outings, mainly adult tourists travel by tourist coach and many of the picnic parties are almost exclusively adults. Teenagers are not regular users of the grassed area for picnics, barbecues or the playground, but make more use of the bushland for cycling, walking and various other purposes not liked by local residents.

Collated Information:

It should be recognised that some respondents answered on behalf of others in the family/group, some questions were not answered at all, there were many who had not visited the Museum so did not answer those 5 relevant questions, and some ticked more than one answer in various questions.

The percentages have also been rounded off and therefore, they do not necessarily total 100% on any answer.

The two reports have been added together to indicate usage of the area, but identification of a conflict of interest between local residents and others has been made in the separate questions.

Question 1 (Respondent's normal place of residence)

	1st stage %	2nd stage %	total %
City of Melville	83	47	65
Other parts of the Perth Metropolitan area	13	48	30
Overseas	2.5	0.5	3
Country WA	3	2	2.5
Another State of Australia	3	2	2.5

As may be seen in both stages of the survey, a high percentage of forms have been returned from residents of Melville. It is very obvious that people in the area feel very strongly about the Park and use it quite regularly. The bias towards local residents in the 1st stage is partly because of the survey of those living adjacent to the Park, but, as then, many visitors surveyed in the park are local residents.

Question 2 (Number of previous visits to Wireless Hill Park in the last 12 months)

2 - 10 times	28	52	40
Over 10 times	48	11	29.5
Never	5	20	12.5
Once	6	17	11.5

Those visiting more than 10 times, generally did so at least 3 or 4 times per week.

Question 3 (Source/s of information about the Park)

Advice from other people	25	51	38
Other e.g. lived nearby/always known	52	8	30
Local sign	8	17	12.5
Chanced upon it	10.5	9	10
Advertisement	1	1	1

Again, word of mouth was the main advertisement for the Park.
As in the first stage, many people had grown up in the locality (and in many instances still lived in the area - up to 60 years), had lived there at some stage of their lives, or still had property in the area.

Some 'just saw it' when they moved into the area or were taken there by family or friends. Some indicated that they knew about the Park from Radio Station Sonshine FM or local papers.

Question 4 (Season of the year for most visits to the Park)

All year	53	35	44
Spring	25+	44	35
Summer	20	18	19
Autumn	16.5	3	10
Winter	9	1	5

As may be seen, nearly half of all respondents visit the Park at all times of the year, and this was very obvious when talking to those surveyed in the area, many bringing their children.

Spring is obviously the next preferred visiting time, but even on cold days, there were always people in the park - sometimes just sitting in their cars.

Question 5 (Major reasons for visiting the Park)

	%	%	%
Walking/jogging	60	40	50
Picnicking	27	60	43.5
BBQ	31	46	39.5
Wildflower Study	30+	39	35
Sightseeing	24.5	21	23
Walking the dog	32	3	17.5
Other	10+	5	8
Telecommunications Museum	7	5	6
Cycling	6	3	4.5

At least half of those surveyed visited the park during walks/jogs (with or without dogs) or participated in walks while in the area for picnics and BBQs. This was borne out by observation, as many people had their meal first and then walked around the Heritage Trail or looked for wildflowers during the September survey.

Again, as in the first survey, the majority of other visitors were there for picnics or barbecues and most of them appeared to be in family or social groups such as re-unions, birthdays, Fathers' Day.

Many commented, when interviewed on Fathers' Day, that the crowds were less than usual, possibly because of the early rain and the fact that the Eagles were playing an important football match in the afternoon (many left reasonably early so that they could watch the match on TV!).

The children's playgrounds, freedom and safe play for children were mentioned by many visitors and many visited with children after school or brought their grandchildren regularly for visits.

A few saw it as a quiet spot to do some work or to see Xmas lights or the Skyshow. Picnics with Church, YMCA, school and social groups were also mentioned, as were compass/navigation exercises with Melville S.H.S. students, Carols by Candlelight, orchids, family re-unions and birthdays, and to show visitors to this State.

There was a strong core of return visits after initial introduction from family events.

Question 6 (Distance normally living from Reserve)

Within 1 km of the park	60	13	36.5
Between 1 - 5 km from the park	20	31	25
Between 5 - 15 km from the park	12	33	22.5
More than 15 km from the park	7	19	13

Again, those living in close proximity to the Park, are the main users of the area (62%). However, because of the better weather and the wildflowers, in the Spring visitors are attracted from a greater distance.

Question 7 (Method of transport used to visit Park)

Car/motorcycle	40	87	63.5
Walking/jogging	69	10	39.5
Bicycle	9	3	6
Bus	2	8	5

On any of the counts of vehicles in the car park, few motorcycles were noted. The indications are, therefore, that the area is more acceptable to young children (brought there by their parents in family groups) or to older citizens. In this Spring survey, there were numerous small coaches noted with senior citizens and residents of nursing homes as passengers. some of these people were surveyed, but often the coaches did not stop for more than a few minutes, particularly on the cold, wet days.

Even if some people had travelled by car a particular survey day, they noted that they generally walked there.

Conversely, comments were made as: totally satisfactory, very good condition, no complaints or no damage, have not noticed any harm.

While nearly 50% noted litter, and around 25% or more noted destruction of vegetation, vandalism and graffiti as a problem, it would seem that those living close to the Park have observed all of these issues more than those just visiting.

To some extent, this could also be because nearby residents explored more of the area than those on short visits, with some day visitors not ever leaving the grassed area, and so they are unaware of problems in the bushland.

Question 10 (Condition of Park)

Good condition	50	60	55
Excellent condition	7	27	17
Moderate condition	30	8	17
Poor condition	9	-	4.5

While at least 72% of the overall visitors believe the Park to be in good or excellent condition, it is obvious that local residents have higher expectations than those 'just visiting'.

There could also be some difference because of the time of the year, the level of maintenance was different and the fact that the wildflowers were in bloom in the Spring survey, so they perhaps obscured any problems.

Comments included:
Magic place / picnic area and wildflower walks. / Lovely to see wildflowers so well protected yet no guards visible. / Very pleasant surrounds. / Very clean and well maintained / The wildflowers are beautiful. / Facilities and gardening, lawns, etc all seem well looked after. / Should be left as is; except for toilets.

Toilets need upgrading, better improved on, bit more light, paper towels, etc or blow dryer /

Litter spoils nature reserve / It used to be in far better condition when the previous caretaker was here. We often pick up litter.

Unable to answer as only short visit for children to play. / More shade for intense heat of summer.

Intrusion of exotic plants. Erosion of soil by people walking through bush. / Spray picnic lawn area for 'Bindi'. / Grassed areas are quite weedy as are bush edges.

Question 11 (Dogs should be:)

allowed in the park but kept on a leash	69+	58	64
not allowed in the park at all	15	26	21
restricted to a given area	10	18	14
allowed anywhere in the park	8	1	4.5

Comments made:
Restrictions - Dogs should not be allowed in wildflower area or picnic area (especially as big dogs have been seen to be allowed to lick taps that children were drinking from) / kept on bike paths.

Many believed that they should be kept on a leash and then only if poo bags are carried by owners, or as long as droppings are cleared away and pooper scoopers should be mandatory.

People who live close to the Park and walk their dog/s there throughout the year appeared to be those who favoured freedom for dogs the most. People who were with children appeared to be those most against permitting such freedom.

Question 12 (Awareness of the history of the first radio station in WA)

Aware	80	63	71.5
Not aware	20	34	27

While there appears to be a high rate of awareness of the history of the area, some answering yes, stated that they had only incidental knowledge or had never bothered with details.

Question 13 (Whether respondents have ever visited the Telecommunications Museum)

No	42	63	52.5
Yes	54+	31	43

In some instances, children only had been to the Museum. It appears that a high percentage of those visiting the Park had no wish to enter the Museum, even if they had visited numerous times.

Question 14 (Number of visits in the last 10 years)

Once	26	22	24
2 - 10 times	24.5	9	17
Over 10 times	3	-	1.5

'Visited it during its formative years.' was one comment. Others related, in conversation, to the fact that the Museum was not open when they visited or that 'in previous visits they had seen it all and by all accounts nothing has changed'.

Many visitors apparently did not see the Museum as relevant to their outing.

Question 15 (Purpose of visits to the Museum)

Recreation	16.5	16	16
Using the park and decided to visit	22	10	16
Education (sometimes with school)	13	8	10.5
Interest in Telecommunications	9	4	6.5
Professional/Hobby	2	1	1.5

It would appear that school groups or hobbyists/professionals are those most interested in the Museum and likely to make a special visit. Others tended to visit it on the spur of the moment while in the Park.

Question 16 (How Museum was discovered)

Local sign	32	23	22.5
Advice from other people	7	6	6.5
Other	7	5	6
Advertisement	2	2	2
Tourist brochure	1	1	1

Comments under 'other' were mainly that people lived in the area, had discovered it when visiting Park or that it was common local knowledge.

Question 17 (Whether tour was guided or not)

No tour and at own pace	38	21	29.5
Free Open Day	10.5	8	9.5
Guided tour with group	5	4	4.5

Because of the 'spur of the moment' decision it appears that the interest is more recreational than educational, so people are happy to browse.

Question 18 (Suggestions for improvement of the quality of the Museum experience)

More 'hands on' displays	14	11	12.5
More working exhibits	18	5	12.5
Better signs/labels	7	4	5.5
More recent technology	5	1	3
Other	2	1	1.5

'Hands on' displays and working exhibits would be appreciated by many, especially those with children, although there were comments concerning the need for better signs.

Some stated:
There is a need to go only once and visit was satisfactory. / Have no advice because it really doesn't interest me at all. / No particular suggestion comes to mind.

Others believed that: No improvement needed. / Not sure. / It was adequate. / OK as is. / Have not visited it yet. /Well displayed. /Satisfactory quality already.

However, some respondents said:
Need for control of Geraldton Wax - too large. / Charge less or nothing to get into Museum. / Children love 'hands-on' diplays.

Question 19 (The following would be appreciated in the Park)

More signage on flora/fauna	45	50	47.5
More shade	46	44	44
More seating	41	30	35.5
More rubbish bins	36	18	27
More signage on history	28	14	26
Separate walking/cycle paths	31	18	24.5
More BBQ facilities	22	26	24
More visitor information/education	26	14	20
Kiosk	17	22	19.5
Improved pathways	34	5	19.5
More playground equipment	22	16	19
Cafe	22	13	17.5
More talks on plants	16.5	17	17
More talks on site history	14.5	12	13.5
More signage on Park facilities	16.5	8	12.5
More heritage development information	12	10	11
More fencing (to protect vegetation)	16.5	4	10.5
Increased visiting hours to the Museum	7	12	9.5
Other	-	8	4
More parking space	1	4	2.5
Against Cafe	16	14	15
Against Kiosk	11	16	13.5

The majority of those against the construction of a cafe or kiosk in the Park, seemed to be concerned about a building which was not in sympathy with the environment, the potential commercialisation of the Park or the possible continual 'scrounging' by children if a kiosk was on site.

Comments included:
Is there a booklet to identify flowers, trees. bird and other calls? Guided tours - as like (sic) Kings Park. / Everlastings. / (More talks on plants) maybe during wildflower season.

Notices (required) warning people to take valuables with them when walking. / Spray bindi prickles in lawns. / A huge landmark e. g. A big purple goat.

Windbreaks. / Trees pleez (for shade). / Trees only (for shade). / (More shade) as in trees.

Tables. / More covered seats (x 2). / Facilities for wheel chairs. / More drinking fountains. / Lights in toilets. / Sign advertising more parking. / Kangaroos (x 7). / More seating on paths. / More shade over tables. / Signs. / cleaner toilets/more drinking fountains.

No more development. / Please keep naturalness - no more development. / Bugger off - Its good just the way it is - Thanks. / We like it as it is - It's lovely - Wish it was bigger. Leave it natural state as much as possible (x 2). / Leave as is (x 2). / I would like to see it kept as natural and simple as possible. / Keep out any development. / Don't overdevelop park. Natural bushland is good. No need for kiosk, cafe as there are plenty in surrounding areas. / Its fine just as it is. / I enjoy it as it is. / Nice as it is (x 2). / We are very happy with it as it is.

Some signs to ensure that people take their garbage with them, not overfill bins. / We couldn't visit the Museum today (Thursday).

Less vehicles to be driven around the park, especially near the children's play areas, so that our children can safely run around. / Cycling path in middle of playground could be hazard. / A safety railing is needed to block the gap of the green lookout closest to the wooden equipment so children do not fall out.

You have an excellent facility here, which is very well maintained, which we are very lucky to have - congratulations on such a lovely area, your staff are to be congratulated on such a nice area.

Keep up with tourist flow and provide cafe if required. Lots of international/state tourists. I feel there is the potential for a second Kings Park with associated facilities.

Question 20 (Other comments)

The Park is beautiful. It takes them back to their youth. Not to remove anything, no more roads. (from a coach tour of senior citizens) / Lovely peaceful spot.

CONCLUSIONS:

*** Local Park/Neighbourhood Park/Regional Park?**

As with the first stage of the survey, it is quite obvious that the Wireless Hill Park is used by a majority of people as a local or neighbourhood park, as 65% of all users surveyed were from the Melville area.

The forms were given to at least one representative of every group in the Park (some of which had up to 45 participants) and in many instances to more than one, so it may be seen that Melville residents are always enjoying the area, either on regular visits for walks or jogging, or with groups of family and friends.

While there is always a reasonable percentage of people from outside the area in the Park, during the Spring nearly 50% of all visitors are from other parts of the metropolitan area, so it rates highly as a regional park.

The need for good communication and interaction with local residents if upgrading is to be achieved smoothly - particularly if there are proposals for any building construction or cafe/kiosk - should remain a high priority.

Another list of 30 respondents is attached to this report for those who wish to be kept informed of Council intentions for the area, so they should also be included in workshops scheduled for planning purposes.

*** Management Issues**

While more than half of the respondents believe the Park to be in good or excellent condition, most would like to see the litter cleared up, natural vegetation protected and extended, and vandalism curbed. It is probable that some respondents had not moved out of the grassed area so did not notice the bushland areas and that those reserves were better/worse on some days than others, so influenced the response.

Many mentioned that the establishment of a Botanic Garden or something similar would be a major asset, especially if there were interpretative strategies included, such as pamphlets, improved signage, talks and better direction given to points of interest.

Dogs and their impact on the Park remain a big concern and this issue will require careful management.

*** The Telecommunications Museum**

A high percentage of visitors are aware of the history of the Park, but more than half have never visited the Museum. Of those who have, it is fairly evenly divided between those who attend only once and those who inspect it more often.

There were still comments that the Museum was not open when people visited the area and that more 'hands on' and working exhibits would encourage an interest. It appears to be virtually unknown outside the area or unless people have a specific interest in telecommunications or related issues, and most prefer to view the Museum in their own time.

*** Facilities/services required and upgraded**

While the desire for shade (especially from trees) and more seating in suitable locations again received high scores, the highest requirement from visitors, particularly in the Spring, is more signage on flora and fauna. Tied into this request for shade and seating, was the need for shelter when the weather becomes inclement and for some amenties for 'large group' lunch settings, especially for older people.

Many people made comment on the amount of wildflowers in the area, particularly the orchids, and believe that the area should be protected and upgraded so that all could enjoy it.

More rubbish bins and BBQs received high priority, as did the separation of cycle and walking paths and improvement of the latter. Requests for more signage on the history of the area and better visitor information and education balanced these requests.

Again, the cafe or kiosk issue raised many concerns. Those **against** the possibility were generally very adamant that this should not occur and cited environmental and commercialisation issues, as well as children pressuring parents for snacks.

However, those **for** the idea, believe that an amenity such as a small cafe (rather than a kiosk) would attract those people not willing to sit on the grass for a picnic e.g. elderly people, tourists, pregnant women, those who would prefer to enjoy the scenery without needing to pack any sustenance and those who would just arrive, find a nice setting and stay to enjoy it. If it was a cafe rather than a kiosk, children would not be catered for with 'snack' food and so there would not be the same pressure on parents.

Several also mentioned the possibility of Council attracting some revenue through such an outlet. Most understood that Council would have to allocate a budget for upgrading the Park, and mentioned that some possible source/s of revenue would be required.

People who believe that there are already sufficient catering outlets in the Booragoon Shopping Centre, possibly do not understand that most people on a tour would go elsewhere for a drink and eats rather than enter any such centre, and that many visit the Park during hours that the centre is not open.

The playgrounds received attention from approximately 19% of the respondents, with comments being made as to the location of the roadway and paths in relation to these, and the need for safeguarding the lookout towers to prevent children climbing in unsafe places.

The toilets came in for a lot of criticism, regarding cleanliness and light, particularly on weekends when there are more people in the Park.

*** Traffic problems**

Again, the major concern was of vehicular movement through the Park - whether cars or bicycles. With some planning, there should not be a need for the provision of more parking spaces as the car parks were never entirely filled while the survey was in place, but a re-arrangement of the existing spaces is necessary.

The re-arrangement of the road system and the parking areas should:
- provide better definition of the road system for vehicular use in a safe and logical manner, and with signs which indicate parking areas, access to picnic sites and walk trails (including the Heritage Trail and wildflowers) and toilets;
- separate children's play areas from roadways and cycle paths;
- provide easy access for picnickers - especially those with young children and/or elderly companions who may not be able to walk far - and a mass of equipment;
- provide paths which are easily accessible for wheelchairs and prams and which have even surfaces;
- separate walkers and cyclists;
- block some existing tracks to deter walkers, cyclists and vehicles;
- permit after dark usage for sightseeing, but with some deterrents to vandals and other deviants.

*** On-going consultation and review**

The information gained, and its emphasis, did not alter greatly from one survey to the other, but there is a need for continuing communication with the community and for review, if the Wireless Hill Park is to maintain its reputation and its use as a local, neighbourhood and regional park in a location which is central, has some natural attributes and provides magnificent views.

WIRELESS HILL SURVEY - SEPTEMBER 1995

Day/date/time	Number - adults/children		Number cars - main c'park/other		Number bikes - ridden there/used		Number dogs seen grassed area/other		Forms collected - Comments made
Sun. 3/9 11.30am	59	34	17	11	-	-	1	-	Nice day after early rain Complaints re lack of clear signage from highway Complaint re dogs drinking from tap/dog poo on grassed area Playground too near road/no easy trails for elderly to view wildflowers 48 forms collected
" 12.30pm	102	52	17	38	2	-	4	2	
" 1.45pm	119	59	17	46	2	12	8	4	
" 2.30pm	126	64	21	52	3	20	8	2	
			1 small bus/approx 7 passengers						
Wed. 6/9 12.15pm-1.30pm	Mainly adults I think		21 cars over period around area plus 1 sml coaster bus - elderly passengers		-	-	-	-	very wet and windy - no forms collected
Sat. 9/9 2.30pm	32	34	23 cars in area		2	-	2	2	Nice day after cloudy/cold start. Group of young men in car park (vomiting)
3pm	21	29							
3.15pm	27	33			2				
3.30 - 4pm	45	41	30 in area						
	People park and head into bush								

WIRELESS HILL SURVEY - SEPTEMBER 1995

Day/date/time	Number - adults/children		Number cars - main c'park/other	Number bikes - ridden there/used	Number dogs seen grassed area/other	Forms collected - Comments made
Sun. 10/9 10.30am	32	8	6 9	8 child bikes (picnic area)	3	Fine weather Swings, BBQs, lookout towers continually used, comments on survey that it looked large. Complaints re lack of clear signage to parking i.e. to transporting elderly family members to BBQs. Most parking near start of trails, picnic area.
11am	32	10			2	
11.30am	54	13	16 15		4	
12noon	56	16		-		
12.30pm	62	20	14 18		5	
1pm	118	40		10 + 2 adult bikes	-	
1.30pm	130	50	20 36		7	
2pm	130	50	+ 1 m/bike		1	
2.30pm	154	50	18 40			
			+ 1 x 32 seater tour bus - wasn't totally full			
Sun 17/9 10.30am	62	20	10 21			overcast weather, rainy period- 'Good to see replacement of dead trees with new small plants', complaints re dog poo, mobile phone structure, not enough BBQs
11am	40	25	+ 44 seater bus (not full)			
11.30am	25	8		2	3	
12noon	52	19	9 12		2	
12.30pm						
1pm	60	20				
1.30pm	86	40	12 23		2	
2pm - 2.30pm			20 28	2		

WIRELESS HILL SURVEY - SEPTEMBER 1995

Day/date/time	Number - adults/children		Number cars - main c'park/other	Number bikes - ridden there/used	Number dogs seen grassed area/other	Forms collected - Comments made
Sun.17/9 12noon	18	14	18			weather fine
12.30pm	27	16	21			
1pm	33	18	27	1		
1.30pm	43	21	31	2	2	
2.pm			35	2	2	
2.30pm				-		
3pm	23	17	20 + 1 bus		1	
Thurs. 21/9 12noon	53	38	55			
12.30pm	94	47	58 + 1 bus elderly people			day of teachers' strike - 2 large groups of elderly.
1pm	98	46	61 + bus			lovely park, one of the best, don't bring in kiosks, etc.
1.30pm	102	47	59 + bus			
2pm	102	47	65 + bus			
Tues. 26/9 12noon	108		25 + bus			
12.30pm	111	3	27 + bus	1 motorbike		good weather
1pm	117	4	39 + bus			'lovely park, very nice'
1.30pm	115	4	36 + bus			2 large groups retirees
2pm	115	4	36 + bus			
Sat. 30/9 2 - 3pm	50	42	27			weather fine

APPENDIX 2

SHIRLEY BARNES AND ASSOCIATES - 2005 WIRELESS HILL SURVEY

WIRELESS HILL PARK

REPORT

March 2005

for

CITY OF MELVILLE

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SUMMARY

Wireless Hill Park is a designated Heritage-listed Area and incorporates several disparate locations catering for different spheres of public interest i.e.

- remnants of natural bush which have been degraded over many years and then upgraded, particularly over the last five years: home to a variety of wildflowers and wildlife, and with delineated paths accessible for people with mobility disabilities, and interpretative plaques now being laid

- grassed areas which have been extended over the last few years, with:
  - ✓ shady trees
  - ✓ picnic tables and chairs
  - ✓ some shade shelters
  - ✓ barbeque facilities
  - ✓ substantial and interesting play equipment on a sandy site
  - ✓ public toilets

- the first Telecommunications Station site in Western Australia which now hosts a museum of memorabilia - and some associated old radio towers which provide clear views in all directions for those able and willing to climb the fairly steep stairs

- the base for a Community Radio Station, which has been set up in another of the old buildings

- a destination for tourists and local visitors, with views from the picnic area as well as the large climbing towers, which have been recycled from their previous role as communication towers.

POINTS OF INTEREST BASED ON THE COLLATED INFORMATION ARE:

- The Wireless Hill Park operates on several levels, i.e. as a local park; a neighbourhood park; a regional park; and as a natural (although somewhat regenerated) bushland, which means that people are often looking for different experiences and that there will be conflicts of interest which need to be reasonably balanced.

- Afternoon winds circulating on the hill even on very hot days in the summer, ensure that it feels quite cold, so the visitor numbers decrease quite rapidly once the sea breeze makes its presence felt

- The number of large, informal picnicking groups on Sundays in the middle of the day has increased noticeably since the previous surveys were undertaken in 1996.

- On other days – even Saturdays – there is nowhere near the same visitation volume.

- More specific interests are catered for at other times i.e
  - ✓ local residents enjoy the area for exercise and dog walking, as well as the bushland and picnic and playground facilities
  - ✓ diverse tour groups visit during the week (in the Spring time in particular,

although also as part of some 'charter tours' during a day's itinerary at other times of the year during 'good' weather)

- ✓ casual use by parents with young children using the playground and picnic facilities occurs often during the week days for short periods of time – sometimes combined with a picnic lunch, which ensures a longer visit.

- ♦ Those respondents exercising and/or dog walking in the Park, usually attend for a specific limited time on a majority of days during the year in all weathers and generally reside within walking distance, so travel by foot or bicycle to the Park and move around the bushland pathways. The majority of them take a keen interest in the overall environment there, and many pick up litter and place it in the rubbish bins as they travel through the area. They also visit at other times for diverse recreational purposes and have a great commitment to the park

- ♦ The Park generally appeals to:
  - ✓ Those residing within walking distance of the area who visit at all times.
  - ✓ Those enjoying the Springtime display of wildflowers.
  - ✓ People just enjoying the aesthetics of the Park, including the scenery and the peace and quiet
  - ✓ Young families during good weather
  - ✓ Informal/semi-informal groups with a specific interest i.e. extended family or work related, as it is considered to be fairly central for people from all areas and parking is not usually a problem (although on some occasions prior to Christmas, there were virtually no free parking spaces and the grassed area hosted a capacity crowd).
  - ✓ Tour groups at specific times, such as during Spring and/or as part of a broader itinerary while on charter, primarily appealing to older citizens and tourists
  - ✓ Casual users for short scenic viewing, photo opportunities and/or 'toilet stops'
  - ✓ There are also many others who drive through the Park without appearing to use any of the facilities - including lone males, couples and groups of all ages. They seem to be inspecting the overall park and its facilities and occasionally make an apparently unscheduled stop to climb the viewing towers or inspect the view from ground level.

- ♦ There do not appear to be large numbers of interstate and overseas tourists currently visiting the Park and its facilities, although this may change in the foreseeable future as some overseas markets are now being 'tapped' by a few tour operators

  At present, small groups of Western Australians and individuals take their visitors to the Park for the views and the picnic facilities: occasionally to visit the Museum, but it appears most do not have any real appreciation of it or the history of the Park generally.

  There was however, also some disappointment expressed during the survey by visitors unaware that the Museum was not open at all times, as they had visited it in the past and it was an additional reason for that particular 'stop' in their itinerary.

- ♦ Most of the casual users of the Park's facilities visit:

- ✓ during Spring for the wildflowers
- ✓ in summer – when the weather is not too hot
- ✓ in autumn when the weather is not too cold; and
- ✓ occasionally in winter on days which are not too bleak
- ✓ while the regulars visit without any regard for the vagaries of the weather.

♦ Those visiting on a regular basis, even if only weekly or monthly/residing locally or not, do so as part of a desired rotation of experiences for their children/grandchildren.

The perception is that the Wireless Hill Park is a very different experience – for both adults and children – to the other well-known parks in the area i.e. the Heathcote major play experience; Pt Walter foreshore; and the park/playground on the Piney Lakes Reserve, which they visit for other reasons and at varying times of the year.

♦ There is no requirement for any commercial development within the Park.

♦ The signage from the Canning Highway needs to be upgraded, with clearer directions.

♦ If the area becomes increasingly popular, there may arise:
- ✓ Some conflicts concerning parking, although is not expected to be a major issue in the very near future
- ✓ Some conflict between people visiting for a quiet lunch and those who play ball games in the immediate vicinity before/after their own picnic
- ✓ A compelling requirement to upgrade the old toilets.

General comments
There were no negative comments similar to the previous reports in 1996, which addressed issues such as general vandalism, litter, lack of maintenance, dog control and fire risk although there are still major concerns about the night-time, anti-social behaviour and vandalism thought to be instituted by young people (an issue also mentioned by the security staff).

A very high proportion of people did not know anything about the Telecommunications Museum while most visitors were not even aware of its existence until the survey, unless they lived locally. It appears that people residing outside the City of Melville do not have any real access to information about the Wireless Hill Park, its facilities or its history.

The following information has been collated from the input received:
- ✓ Overall praise for the overall Park and its facilities, including the construction of the paths in the bush area and the interpretative work being undertaken
- ✓ Praise for the upgrade of facilities over the last few years and the general standard of maintenance within the Park, including the cleanliness of the BBQs
- ✓ People should not be permitted to play ball games close to or in the same area as picnicking groups
- ✓ The wildflowers are absolutely wonderful and the display of kangaroo paws is magnificent.
- ✓ It is a great central meeting point for people traveling from all over the State
- ✓ A map of the paths and their points of entrance and exit would be useful
- ✓ The Museum needs to be more widely advertised and open at times that are marketed outside the local government area.

- ✓ The viewing towers should be repainted.
- ✓ Toilets should be upgraded and (preferably) relocated.
- ✓ Some lighting at night over the BBQs would be appreciated
- ✓ Shelter from the strong winds would also be appreciated.

REPORT

1.0 The Brief

This report was a 'follow-up' to reports undertaken in 1996, and the collated information was expected to be included in a review of the Wireless Hill Management Plan. The brief was to undertake a survey of visitors to the park and any relevant views from people who had links to the park i.e. tour bus companies and organized groups such as the Friends of the Park. The aim was to ascertain

- ✓ the current reasons for visitations to the park;
- ✓ current age range of visitors;
- ✓ any perceived problems pertinent to access, litter, safety, parking;
- ✓ any community vision, relative to perceived desirable development for the area.

Note:

A late addition to the survey of the main park, was the inclusion of specific questions relative to the Telecommunications Museum, currently open to the public only by appointment.

While this item was addressed to some extent within the overall survey, it was agreed that a smaller additional survey would be undertaken in conjunction with this one, with the results provided separately or perhaps as an addendum. It was agreed that the Museum would open for the public on at least two Sunday afternoons with the Consultant in attendance, and questionnaires would be provided for staff distribution for completion by other visitors i.e. groups visiting by appointment.

2.0 Methodology

It was agreed that:

- ♦ The physical survey would be undertaken over a period of approximately three months, beginning late October 2004 and ending in late January 2005, through three separate periods i.e.
  - ✓ During part of the wildflower season (October/November);
  - ✓ In the pre Christmas/holiday season (December);
  - ✓ In the late holiday season, prior to the new school year (January).

- ♦ The survey would include weekends and weekdays and range over as many times of the day as possible.

3.0 Results:

A total number of 56 completed questionnaires have been collated, including input from 405 adults and 179 children (under the age of approximately 14 years of age). Some visitors were not interviewed because they were obviously there for a rapid exercise stint, particularly in the early morning, or were observed walking through the bush but the Consultant was unable to survey them, especially if interviewing others at the time.

Although only one survey form was used even for large groups to keep the interview time relatively short, each interview included internal canvassing of views concerning the questions, so the answers are still valid. Percentages have been taken on the completed survey forms, rather than the actual numbers of people, for simplicity.

Not all questions were answered on every questionnaire, while some participants provided multiple answers - partly due to the numbers within their particular group.

Eighteen visits were made to the Park during the survey – 7 in the first phase, 4 in the second phase and 7 in the last phase. As the interest was in the reasons for people visiting the Wireless Hill Park – particularly in preference to others – an emphasis was placed on being on site to interview as many people as possible, rather than making numerous visits for a very poor return. As low responses occurred on Saturday afternoons even over an hour - 1 completed form in good weather in December, as well as on two other Saturdays in January – although in one instance, a bushfire in the Hills was beginning to make an outdoors park visit less attractive.

Increasing smoke over the metropolitan area was also the reason for the survey being suspended for a week.

Place of residence

The answers to this survey question re usual place of residence indicate that a majority of respondents are from places other than the immediate area surrounding the Park, although there are many local early morning/late evening walkers and dog exercisers.

Note:

There was no survey of the residents living adjacent to the Park on this occasion, as was previously undertaken in 1996. However, the number of those residents participating in that survey was relatively small, even when offered the opportunity.

Visitors – without surveying those on organized bus tours other than one seniors' group, which did not alter this statistic at all – are from all over the metropolitan area and the State, including Broome, Kellerberrin, Bakers Hill, Midland, Mandurah, Rockingham, Darlington, Chidlow, Mundaring, the Vines, Ellenbrook, Coogee, Bayswater, Subiaco, the Goldfields and Albany. This is specially so while attending the Park as part of an informal group such as a reunion of colleagues/residents or a family celebration, which often also include overseas visitors.

- ✓ Statistics show that approximately 18% of respondents reside within half a kilometre of the Park, with another 3% residing within a kilometre.

- ✓ City of Melville residents from outside that immediate area also visit in large numbers on a regular basis i.e. from Winthrop, Kardinya, Applecross, Booragoon, Bateman, Attadale, Ardross, Palmyra and Willagee – often in conjunction with shopping at Booragoon or attending a particular event such as a church service.

- ✓ Visitors travel on a fairly regular scale from adjacent local government areas i.e. the suburbs of Huntingdale, Shelley, Lynwood, Victoria Park, South Perth and Fremantle - up to 10 or more kilometres away.

- ✓ Regular family visitors in small groups i.e. one or two parents or grandparents and young children, travel from the other side of the river on a type of rotational basis with various other parks in different local government areas, for the use of the playground facilities and the overall peace and quiet - in particular during the week.

- ✓ Generally, within each of the large informal groups which visit the Park, are local residents of the City of Melville, previous residents, or those who have attended at previous times for a variety of reasons, therefore have some knowledge of the area.

Access to the Park

During the survey periods, 25% of park visitors arrived on foot, often entering and leaving in different directions using the existing pathway system.

About 9% of visitors arrived by bicycle generally accompanied by small children, although the adult cyclists stated that they also often walked to the area.

Motor cycles were only noted on one occasion in December, when more than 50 were the chosen means of transport for a large group of 'bikers' and their families attending a Christmas function – complete with a visit from Santa via motorbike.

During the survey three organized busloads were noted, with two arriving for morning tea and a toilet stop before traveling on to Fremantle and/or Jandakot airport, while the other was a group of children and their leaders from a holiday child-care programme in Victoria Park, attending for most of the day. The majority of visitors use private motor vehicles, with the only legal entry from the east.

Note: On one visit by the Consultant, an Australia Post motorbike rider traveled up the hill from the north and then left in a southerly direction using the pathways, which could have some safety ramifications if unexpectedly meeting a pedestrian in the bushland area.

Direction of access

This question – as obviously those driving into the park would enter/exit by the only legitimate route in the east - was inserted to discover which direction/s attracted pedestrians and why.

The logical reason given by each person, was that they often entered and exited by the same path/s as they were convenient to their residences and part of a general circuit while exercising.

There was not any problem with any of the paths as such, although there had apparently been a 'flasher' at times and women had warned each other of the danger, while people from overseas were often not willing to walk on the paths because of perceived dangers from snakes and other wildlife, so most stayed on the more cultivated area.

Tour buses do not generally use the carpark because:

- ✓ They are often 'blocked in' by other cars or it becomes difficult to manoeuvre their larger vehicles around cars which are parked too close to them.
- ✓ Other vehicle drivers complain that they become 'blocked in' because of the size of the buses.

- ✓ It is more convenient for them to be parked on the circular road adjacent to the picnic area for viewing/photography opportunities and convenience when setting up morning tea. (However, this does provide problems for older and/or less mobile passengers who then have a relatively long walk over the grass to the toilet facilities.)

Carparking

While there is a small carpark available at the entry to the man-made facilities at the top of the hill, it attracts only approximately 11% of visitors, with the majority (more than 60% during this survey) parking on the circular road, generally adjacent to the picnic/playground facilities, although sometimes close to the entrance of one or other of the bush pathways. (Some of those parking in the carpark also stated that they had not known of the road parking potential, but would remember in future.)

Reasons for this included:

- ✓ Convenience – especially relevant for those with young children and/or less mobile passengers, plus picnic requirements.
- ✓ Because there are numerous 'break-ins' into vehicles left unsupervised (whether this was an actual issue or a myth, it is well entrenched) and from the most used facilities – picnic area/playground - the carpark cannot be easily seen.
- ✓ 'Just happened to stop here while driving through the park after noticing the (playground) facilities'.

Company on visits

While 16% of respondents were visiting the park alone, or with a dog, regularly throughout the week as well as on weekends during this survey, most stated that they also visited at various other times with family and friends.

Small groups during the week usually consist of a parent or parents with young children, using the playground and sometimes picnic facilities – and always pleased that there are toilet facilities available. These visits are often on a regular basis.

The majority of the visits by larger groups of varying size, are made on a Sunday afternoon and may include:

- ✓ parents with young children;
- ✓ several generations of the extended family, including young children;
- ✓ an informal grouping which could include family and friends for celebrations such as birthdays and reunions, particularly with interstate/overseas relatives – often older participants without any young children; or
- ✓ groups which are based around a common interest such as church or work, 'bikers', parents' group or those who were previously residents of a northwest town, with the majority not including many young children.

Many of the larger groups only meet once or twice a year on a Sunday afternoon, and often only just prior to Christmas.

Organised outings are generally those scheduled by the tour companies, but most are held during the week and then only during the Springtime.

Preference for the Park over others

45% of visitors use the Wireless Hill Park in preference to others in the City of Melville, because they:

- ✓ live nearby
- ✓ enjoy the scenery, peace and quiet and the facilities
- ✓ include it as part of a weekly shopping trip to the Booragoon Shopping Centre
  - particularly senior citizens who then enjoy a picnic lunch (or in the instance of one senior male, he undertakes his walking exercise twice a week, while waiting for his wife to finish shopping).

Those who replied in the negative generally:

- ✓ did not live in the area, or
- ✓ used others in the City of Melville for different interests i.e. the Pt Walter foreshore or the Heathcote playground facilities.

Number of visits

While many of those surveyed were visiting for the first time (18%), particularly amongst the larger groups, there was a substantial number who had either 'just discovered the park after knowing it was there for a lengthy period', or who had now just returned to using the facilities after an absence – due to moving away from the area or not having a young family any more.

Daily or twice daily visitors were generally those who lived within a close proximity of the park and many of them walked or cycled to the area for their own exercise purposes including walking the family dog/s, sometimes with another family member but often by themselves. Others drove there – sometimes meeting up with friends for exercise purposes or for a 'bush walk'which provided both personal exercise and an opportunity to enjoy the environment and the scenery.

Those who attended on a more ad hoc basis i.e. weekly or monthly, tended to be people who resided further away but enjoyed the park as part of a rotation of park visits or to view the wildflowers, often in small informal groups with young children and/or family and friends or irregularly as part of a larger informal group. Some of the latter stated that they had made several visits during the space of a few weeks in this manner, to celebrate family birthdays and/or for 'end of the year' celebrations but probably would not visit again for some months).

Timing of visits

Visitation times showed that:

- ✓ approximately 29% of respondents visited the park at all times of the year,
- ✓ 29% visited while taking visitors around (not necessarily the same respondents - but they always included the Park in their itinerary for the views and sometimes to visit the Telecommunications Museum and several were disappointed that it is no longer open on a regular basis),
- ✓ 25% attended for special community and/orfamily events,
- ✓ 21% visited only in the Springtime,
- ✓ 7% visited during school holidays, especially if the weather was fine (not too hot).

A smaller group attended only for community special events such as the Skyworks or Community Open Days.

Reasons for visiting the Park

- ✓ Nearly 88% visited the Park for recreational use

- ✓ 14% visited for fitness purposes
- ✓ nearly 4% for conservation reasons
- ✓ 2% as a 'path to somewhere else' – usually the shopping centre.

(Note: It should be noted that some respondents to this question nominated more than one of the 'usage' reasons in this question.)

Main attractions of the Park

All respondents mentioned more than one reason for visiting the Park

- ✓ 80% visited for the scenic attractions/aesthetics
- ✓ 75% of visitors enjoyed the picnic facilities – not only for lunch but also for evening meals/breakfasts (these respondents generally lived close by)
- ✓ 66% used the paths and appreciated the upgrading undertaken by the Council
- ✓ 61% enjoyed the bush environment i.e the wildflowers, wildlife in particular or for conservation reasons
- ✓ 54% used the BBQs
- ✓ 52% nominated the playground facilities as a major reason for their decision to visit – either in small or large groups
- ✓ 46% visited the Park as it is close to home
- ✓ 37% % enjoyed taking a break in the area and/or eating lunch there – often alone, but also in very small groups
- ✓ 30% saw it as a good area for exercise – because of the aesthetics, as well as the open space and peace and quiet
- ✓ 18% used it during their exercise routine with their dog or dogs
- ✓ 9% used it as a 'shortcut' to somewhere else.
- ✓ re Telecommunications Museum: 23% had visited – some several times, 21% had never visited (many did not wish to) and 18% stated that it was never open, even if they wished to visit. Many also indicated that they had not heard of the Museum until they actually attended the Park or until it was mentioned by the Consultant.

Comments about existing facilities and the Park itself

Positive:

- ✓ Almost all comments were very favourable, with most commenting on the scenery, 'peace and quiet', BBQ xleanliness, the available shade and the overall aesthetics.

- ✓ Many favourable comments were also made concerning the upgrading of the whole area, with high approval for the playground facilities and the picnic shelters in particular.

Negative:

- ✓ Any unfavourable comments generally concerned the toilets i.e. cleanliness (or lack of) in the toilets on some 'busy' days; the lack of toilet paper in the female toilets; the fact that repairs are not quickly implemented when toilets are blocked or require repair, plus the lack of overall maintenance in ageing facilities. (There was also a comment from one tour bus operator that the standard of cleanliness re the toilets and the bin emptying had deteriorated over the last year.)

This was often aligned with the fact that the toilets were not readily noticed amongst the other buildings – particularly if this was a first visit - and they were not easily viewed from the picnic/playground facilities.

Also, when the bus tours arrive and elderly/less mobile passengers disembark, it is a fair distance for many of them to visit the toilets from the picnic area and return, and the toilets are one of the main attractions for tour schedules, whether tourist or charter oriented. An alternative is disembarkation twice i.e. at each side of the facilities for toilets and views/picnic, but this causes other problems such as negotiating the bus steps for this age group.

Several people commented that the viewing towers could be upgraded i.e, repainted.

General:

The majority of respondents did not believe that there should be any commercial development in the Park, in particular those with young children - as they are pleased to be able to visit without being 'lobbied' for ice-creams/drinks - and older visitors who are pleased with the existing aesthetics of the area.

Even those who think 'a small kiosk would be nice to have a cappuccino after exercise, while enjoying the environment' are not really totally committed to the idea, particularly when considering the potential lack of viability for such an enterprise.

Any barriers to access in the park and its facilities

Only 9% thought there were any barriers and the most common were:

- ✓ Lack of comprehensive signage to the park from Canning Highway

First time visitors stated that they could not decide the correct way to travel after turning off Canning Highway, with several stating that they ended up traveling around/to the shopping centre before discovering the correct way, as there was no further indication of direction until within its immediate vicinity

- ✓ The toilet location

The trek to the toilets over grass from the picnic area for those in wheel chairs is somewhat arduous, and adults do not like children of any age visiting the toilets by themselves, as they cannot supervise them from the playground/picnic area.

- ✓ Concrete kerb

Another comment was that the concrete kerb around the grassed area is difficult to negotiate if the person in the wheel chair is heavier than the person pushing it.

Safety in the Park

The majority of visitors have no problem being in the area alone or with only young children, although some older female respondents would not walk through the bush while by themselves. This was particularly noticeable amongst international visitors/residents, even those who regularly visited – although this appeared to be partly due to an unfamiliarity with the Australia bush.

None of the females would visit the Park alone as evening approached, but most males also stated they would have doubts about entering this area or any other park at night alone. Some respondents had been told/had read that there was quite serious antisocial

behaviour within the Park at night and questioned the Consultant as to whether it was true. A discussion with a Council security staff member endorsed the validity of this information, but the Consultant did not comment on this during the community interviews.

Note: One interesting observation during the Consultant's attendances in the Park was the number of visits to the area by lone males just driving slowly around the circular road without any pauses - no real knowledge was gained of the purpose for their visits.

During most visits by the Consultant there were often motor vehicles parked in the carpark or on the road - occasionally for long periods - without any indication of a human presence, so it is assumed that they were walking through the bushland or further afield.

Age Groupings

This question shows that the age attraction to the park for adults is as follows:

- between 26 – 40 years (39%)
- between 41 – 60 years (27%)
- 60+ years (25%)
- 15 – 25 years of age (12.5%)

It also shows that 44% of the total numbers of visitors are young children, with the majority of these either attending with one or two parents or grandparents for short periods using the playground and perhaps the picnic facilities, or as a very small part of a large group of adults. Even in the larger groups there were under half a dozen young children visiting, although on a few occasions i.e. a young child's birthday party, there was a very high component of children who were not teenagers.

Only younger teenagers appeared to be part of the groups generally, although there are no specific attractions for that age group. Older teenagers are more independently mobile and therefore do not always participate in family outings.

Overall, young families and senior citizens are major users of the facilities.

Input from Friends of the Park

This group has been operating for some years and currently has a membership of around 25, with approximately 15 active members. Most are local residents, while some travel from 10 kilometres south and others come from north of the river.

The group has concerns about:

- ✓ Council sub-contractors using untrained personnel in their work, with no-one taking any responsibility for the completed work or actions involved
- ✓ The lack of water taps for easy watering of new plants
- ✓ A lack of communication with senior management, as there currently appears to be 'lip service' to community views, rather than any real commitment
- ✓ The Council focus on the beautification of the Park i.e. landscape and design, and pruning (on the basis of removal of a fire hazard), rather than appearing to have a commitment to conservation of the natural bushland.

Discussions with tourism personnel

- ***The WA Tourist Bureau*** has very little information on the Park, its facilities or its history, with only contact phone numbers alongside a mention of the Heritage Path and the Telecommunications Museum on its database. ***More information would be appreciated.***

- ***Tour Operators***
  - ✓ During an inspection visit, only one pamphlet was available to the public at the West Australian Tourist Bureau, and/or mentioned the wildflowers in the Wireless Hill Park as part of a longer tour around Perth.
  - ✓ An inspection of the phone book and the Internet led to phone calls to four local tour bus companies.

Of those contacted:

- two stated that they were seldom asked to include the Park and so only visited about once or twice a year while on charter
- one stated that buses were sent there a few times per year, as required/requested for charter
- one company visited at least 4 times per week for 8 weeks every year during the wildflower season, as part of a deigned itinerary, when a fully qualified botanist is employed to meet the bus just inside the entrance to the Park and act as a guide to passengers, monitoring their use of the paths etc for photo opportunities.
- the general perception is that some of the smaller 'niche' tour operators also only visit occasionally.

All companies stated they knew very little about the Park, the wildflowers display or its history (including the Museum). In fact, most were quite surprised there was any real history or attractions there. However, all would appreciate relevant information - specifically to be able to advise people seeking points of interest for potential charter tours.

Most tours through the Park last about 10 - 20 minutes, mainly for photo/scenic opportunities, although one bus arriving while on charter during the survey spent about 45 - 60 minutes, so its elderly passengers could visit the toilets and have morning tea.

However, the bus company visiting on a regular basis in Spring allows approximately 2 hours for a bushland walk with the qualified guide, plus morning tea. (A company staff member also commented one of their groups had been 'shouted at' by a member of the Friends of the Park, while another private group tramped through the area without any regard for the designated paths and was not accosted.)

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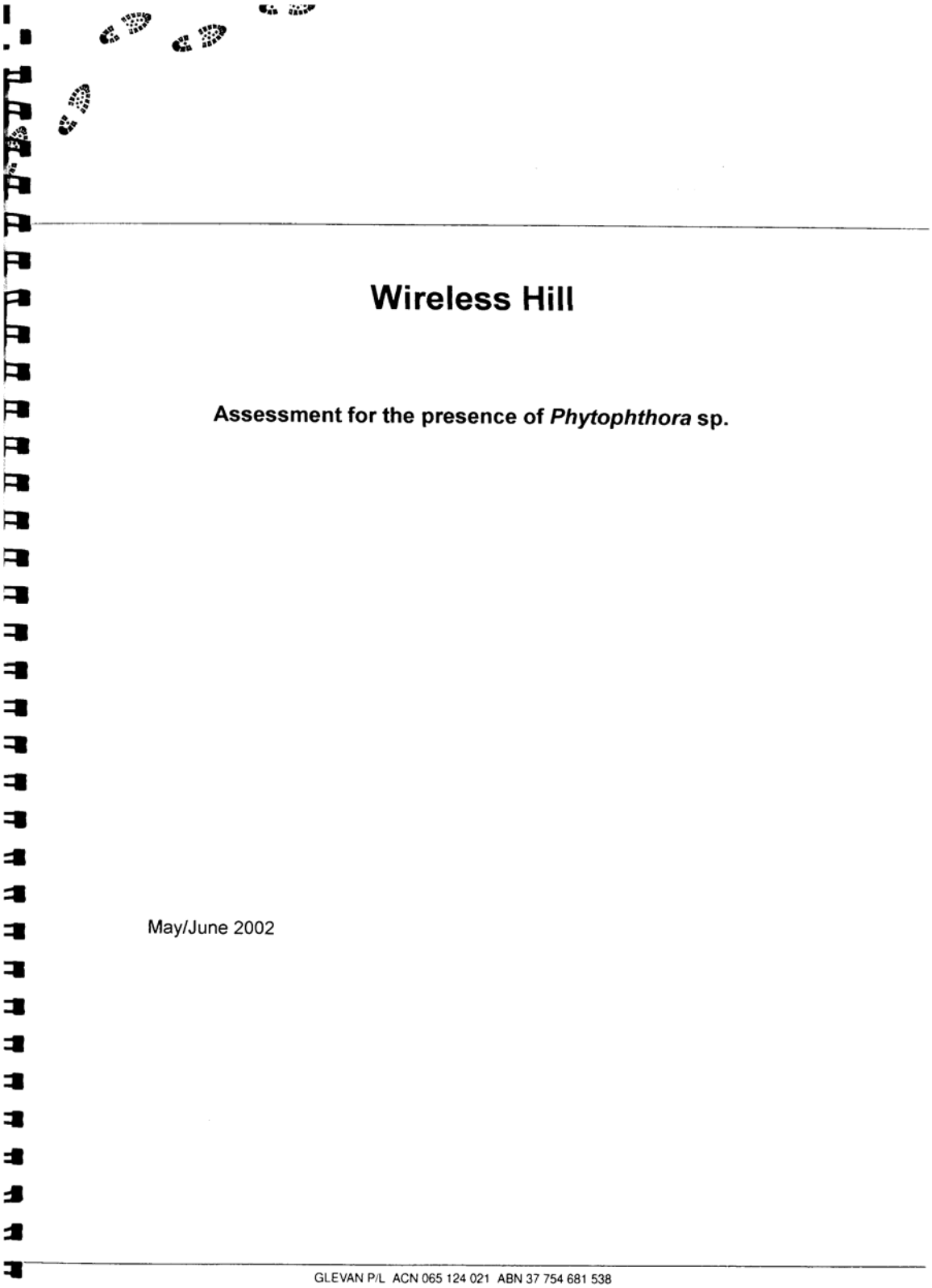
APPENDIX 3

GLEVAN DIEBACK REPORT - 2002 WIRELESS HILL



Wireless Hill

Assessment for the presence of *Phytophthora* sp.

May/June 2002

GLEVAN P/L ACN 065 124 021 ABN 37 754 681 538

Introduction

Glenn Tuffnell of Glevan Dieback Consultancy Services assessed Wireless Hill for the presence of *Phytophthora sp.* (dieback) between the 14 of May 2002 and the 25th of July 2002.

This reserve is approximately 33 hectares in area and is located in the suburb of Ardross in the City of Melville.

This assessment was conducted by examining all susceptible vegetation within the boundaries of the reserve for disease caused by *Phytophthora* species. All vectors have also been scrutinised for symptoms associated with *Phytophthora* infestation.

Twelve soil and tissue samples have been taken in this reserve as part of the overall *Phytophthora* interpretation. These samples were processed at Calm's Vegetation Health Service located in Kensington.

All digital information has been collected using a handheld GPS using the Australian geod 84 datum.

All dieback lines have been taped in the field using day-glo orange tape. This is a temporary form of demarcation and ideally should be permanently demarcated within the next few months to avoid loss through fire or vandalism.

Phytophthora sp.

Phytophthora are introduced soil-borne pathogens (water mould) that kill a wide selection of plant species of the south west of Western Australia. The pathogens almost certainly entered Western Australia shortly after the European colonization and have since produced a complex mosaic of infested and uninfested areas in the southwest.

The spread of the pathogens accelerated after World War II with the implementation of heavy machinery that was used for road building and logging activities and which unknowingly spread infected soil.

The life cycle of *Phytophthora* requires moist conditions that favour the survival, sporulation and dispersal. As *Phytophthora* is a parasite, it requires a living host on which to feed and extracts its food by a mass of thread-like mycelium, which forms the body of the organism. The fungus kills the host by girdling the base of the stem, destroying the roots and depriving the plant of access to nutrients and water.

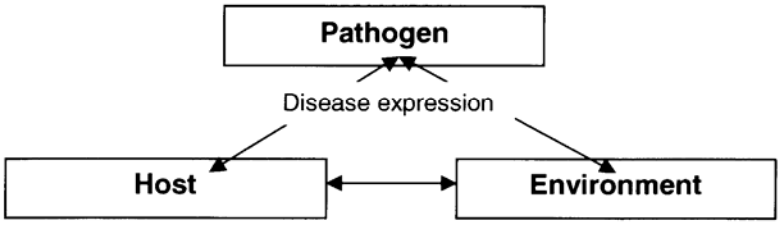
Given warm, moist conditions, the mycelium is capable of producing millions of tiny spores that reproduce the fungus.

Zoospores are microscopic spores that can actively swim toward new hosts and initiate new infections. These spores are produced in large numbers but

are fragile and short lived. As they move through the soil, the zoospores lodge onto plant roots, infect them and produce mycelium in susceptible plants. The zoospores are attracted to the growing tips, which they penetrate with germ tubes. Some host plants can resist the attack of the *Phytophthora* with the formation of blocking lesions or resist entry by having tough epidermal cells on root hairs. The zoospores can also be carried along in moving water.

Disease triangle

For *Phytophthora* to survive it requires a combination of the pathogen, host and suitable environmental conditions, as illustrated in the following diagram.



The removal of any factor from the triangle means that the disease cannot exist at the site.

Pathogen

The most common *Phytophthora* that causes disease in native vegetation is *Phytophthora cinnamomi.*

Environment

The environment is considered to be the sum of all factors that impact on an individual organism during its lifetime. Factors included in the environment include temperature, the soil structure and moisture.

The optimum temperature for the growth of the organism is between 15°C and 30°C while the optimum temperature for sporulation is considered to be 25°C to 30°C. Any temperatures less than 0°C and greater than 35°C are unfavourable to the survival of the spores and mycelium of *Phytophthora cinnamomi.*

Infertile soils are more compatible to *Phytophthora cinnamomi* where there is a good movement of water and little biomass with few antagonistic microflora. The soil texture allows for the easy lateral movement of the motile zoospores and the easy development of mycelium.

Clay and laterite, significant components of some soil types of the southwest act as impeding layers and causes subsurface ponding that facilitates the production of spores. These soils tend to drain laterally, further spreading the

zoospores. The moisture content of the soil must be at a level to provide for an aerobic situation. Saturated soils become anaerobic and don't contain enough oxygen to favour the production of sporangia.

The colonization of *Phytophthora* infections has reached epidemic proportions in areas that are environmentally suited to the establishment, survival and reproduction of the pathogen. These areas are generally in areas receiving more than 800mm of rainfall annually. In areas receiving between 600-800mm, the occurrence of *Phytophthora cinnamomi* is less extensive and confined to water-gaining sites in the landscape.

Hosts

Phytophthora has a very wide host range. Generally, the indigenous species most affected by the pathogen belong to the following families:

- *Proteaceae*
- *Epacridaceae*
- *Papilionaceae / Fabaceae*
- *Myrtaceae.*

Not all genera within a family nor all species within a genus are necessarily susceptible.

The plants that would express symptoms associated with the *Phytophthora* pathogen in this reserve are as follows;

Adenanthos cygnorum
Banksia attenuata, grandis, ilicifolia and menziesii
Conostylus aculeata
Daviesia sp.
Dryandra nivea and sessilis
Eucalyptus marginata
Hakea sp.
Jacksonia sp.
Lomandra sp.
Luecopogen propinquus
Patersonia occidentalis
Persoonia saccata
Petrophile sp.
Stirlingia latifolia
Synaphea spinulosa
Xanthhorrea brunonis, gracilis and preissii

Disease expression

Phytophthora appears to absent in the majority of the reserve with the northern face of the reserve being the only exception.

In the bushland between the top car park and Canning Highway three out of a total of ten samples have returned a positive result for *Phytophthora cinnamomi*. This has resulted in two separate taped infestations, one abutting the top car park and the other abutting Canning Highway.
The vegetation between these two sites appears to be unnaturally open but this may be due to repeated hot fire activity and poor plant regeneration.
The expression in the sites themselves is very cryptic with low numbers of indicator species deaths observed.
The overall subtle nature of *Phytophthora* in the infested sites and the general lack of the pathogen within the reserve may be due to the underlying calcareous soils. Vegetation communities found on these soil types are typically protected from high impact *Phytophthora* infestations due to the high soil alkalinity, which is unfavourable to the proliferation of the pathogen. However, the overlying yellow and brown infertile soils combined with the dense host have allowed the pathogen to get a foothold in this situation.

Samples

Sample 1 AMG 0389102E 6455528N 14/05/2002
A. cygnorum, B. attenuata and B. menziesii deaths sampled on the northern slope of the hill on a vegetation change that was initially thought to have been caused by repeat hot fire activity.
This sample has returned a **positive** for *Phytophthora cinnamomi* result.

Sample 2 AMG 0388846E 6455152N 14/05/2002
Single fresh B. attenuata, suspect drought.
This sample has returned a **negative** for *Phytophthora* result.

Sample 3 AMG 0389168E 6455795N 12/06/2002
Small area of deaths in the northeastern end of the reserve possibly drought related. Single fresh *B. attenuata* sampled however several very decomposed *X. preisii* deaths are also present in this site. This area should be monitored for more deaths in the future and may need to be resampled.
This sample has returned a **negative** for *Phytophthora* result.

Sample 4 AMG 0389251E 6455580N 12/06/2002
This sample was taken on what appears to be the eastern extent of the infestation on the northern slope. *S. latifolia* and *A. cygnorum* were sampled. Sample 8 is a resample of this site.
This sample has returned a **negative** for *Phytophthora* result.

Sample 5 AMG 0389053E 6455441N 12/06/2002
This sample is an isolated cluster of deaths on the western side of the infested northern slope. Sampled plants include *E. marginata, B. menziesii* and *X. gracilis.*
This sample has returned a **negative** for *Phytophthora* result.

Sample 6 AMG 0389179E 6455546N 10/07/2002
X. preisii and *B. attenuata* sampled eighty metres east of sample one directly downslope of the car park. This sample is thought to represent the highest point of the infestation.
This sample has returned a **positive** for *Phytophthora cinnamomi* result.

Sample 7 AMG 0389201E 6455586N 10/07/2002
P. occidentalis sampled below sample six.
This sample has returned a **negative** for *Phytophthora* result.

Sample 8 AMG 0389246E 6455571N 10/07/2002
Resample of sample four.
This sample has returned a **negative** for *Phytophthora* result.

Sample 9 AMG 0389243E 6455618N 10/07/2002
P. occidentalis and *C. aculeata* sampled on what was thought to be the eastern edge of the infestation.
This sample has returned a **negative** for *Phytophthora* result.

Sample 10 AMG 0389160E 6455663N 10/07/2002
C. aculeata, Jacksonia species and *S. latifolia* sampled in the middle of the north slope infestation.
This sample has returned a **negative** for *Phytophthora* result.

Sample 11 AMG 0389062E 6455738N 10/07/2002
B. attenuata and *S. latifolia* sampled on the bottom edge of the north slope infestation approximately 30 metres above Canning Highway. Numerous indicator species not expressing in this site and a lack of disease pattern highlight the subtle nature of *Phytophthora* expression in this area.
This sample has returned a **positive** for *Phytophthora cinnamomi* result.

Sample 12 AMG 0389034E 6455607N 10/07/2002
C. aculeata sampled on what is believed to be the western side of the infestation.
This sample has returned a **negative** for *Phytophthora* result.

Management

The following recommendations are made in the interest of minimising the risk of *Phytophthora* spread throughout this reserve.

- All soil-moving operations within the reserve need to be programmed to occur during dry soil conditions, preferably in the hot summer months when the pathogen is not active.
- Introduce a Phosphonate application program to ensure the maintained health of surviving susceptible indicator species in the site. Areas to target as a high priority would be in and around the two taped

infestations and a minimum of a ten-metre buffer along all walk tracks, car parks and drainage areas.

- Ensure all plants and soils that are introduced into the reserve are from accredited dieback free sources.
- Ensure all surface runoff from the surrounding sealed roads is not entering the vegetated environment that could possibly introduce *Phytophthora* into uninfested vegetation or exacerbate existing infestations.

Conclusion

This reserve highlights the cryptic nature of old *Phytophthora* infestations on native vegetation in well-drained Spearwood sands that have low levels of *Phytophthora* inoculum in them. It would be expected that impact would increase with favourable weather conditions unless an effective treatment program is implemented.

All disease boundaries have an effective life of 12 months after which they will need to be rechecked by accredited *Phytophthora* interpreters prior to any soil moving operations.

Glenn Tuffnell
Glevan Dieback Interpreter.
July 2002

Disease Occurrence Map 2002

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APPENDIX 4

VEGETATION SURVEY AND OBJECTIVES FOR FUTURE MONITORING PROGRAMMES

WIRELESS HILL PARK

VEGETATION SURVEY AND RECOMMENDATIONS FOR FUTURE MONITORING PROGRAMMES

OCTOBER 2002

PRODUCED BY NAOMI WHITE ON BEHALF OF THE CITY OF MELVILLE AND THE FRIENDS OF WIRELESS HILL PARK

CONTENTS

ABSTRACT

Recognising the importance of enhancing and maintaining the area's conservation values, the City of Melville has taken an active role in the conservation management of Wireless Hill Park since it's vestment in 1969. The City, in association with the local voluntary, community-based Friends of Wireless Hill Park, is currently in the process of implementing the site's 1999 Environmental Management Plan. In response to the Plan's recommendations for flora and weed management, the Friends group commissioned this survey and study in Spring 2002 to establish the general condition, diversity and cover of vegetative communities, and to recommend appropriate strategies for future monitoring of the site by the group.

Following two initial training sessions with the group, it quickly became apparent that the detailed, data-heavy survey methods originally applied would not be appropriate for effective long term monitoring by a voluntary community group. A more general, and much faster survey method was subsequently applied to determine coverage and range of species in each quadrat. Vegetation condition was estimated according to methods developed in Bronwyn Keighery's 1994 work, *Bushland Plant Survey*, and as conducted by the City of Melville in producing the 1999 Management Plan.

Overall condition of the park's vegetative features were rated as good to very good. Some improvements have been noted at the site since the last condition report was completed in 1999. Notable conservation gains have been made on the Park's northern edge, where the local Friends group has effectively controlled what are understood to have been substantial Geraldton Wax (*Chamelaucium uncinatum*) populations.

Of the species noted at the time of the survey (during mid to late October) some 15% were weeds. It is expected that this figure would be higher in late winter/ early spring, when non-native grasses such as *Bromus diandrus* (Great Brome), *Ehrharta calycina* (Perennial veldt grass) and a range of other winter weeds are actively growing and flowering. Conversely, the ratio of non-native to native species would be expected to be far lower in mid Summer, when native grasses tend to be more active (and therefore more readily identified).

The spread of *Ehrharta calycina* (perennial veldt grass) appears to have declined significantly since the 1999 vegetation survey, when the species was noted to be "heavily infesting" some areas of the Park. However, early spring surveys (when this species is most active) should be conducted to determine whether regular spraying of the site is effectively keeping this species under control. Geraldton wax populations have also been significantly reduced since 1999, with only a few scattered individuals remaining on the Park's northern edge. As in the 1999 Management Plan, Gladioli and Watsonia continue to be a major problem throughout the Reserve.

Maintaining and enhancing the quality of native vegetation at Wireless Hill will require ongoing weed control and revegetation programmes. Weed invasion is a serious issue which should be addressed at the outset of any management programme, as there is little point in attempting revegetation in any area of the park that is still colonised by significant populations of weeds. In some instances it may be necessary to conduct weed control for several years before any follow-up works are attempted.

Methods employed to control weed populations will vary from species to species. Manual control methods (such as grubbing, hand-pulling, and seed head removal) should always be utilised in

preference to chemical solutions, however spraying is an only option in some cases. Weed species occurring in low densities or as scattered individuals should be removed immediately, preventing them from becoming established (or re-established) in the Park. The remaining species, which are more entrenched, will be controlled only through a concentrated programme of hand weeding and chemical treatment conducted over several years. Given the range of weeds present at the site, an integrated attack combining physical removal, natural suppession/ containment and, where necessary, chemical control, will provide the most efficient and sustainable solutions for weed management in the long term.

Another significant area in terms of Reserve management is the road reserve and adjoining fringe of the bushland. Without some control, this weedy fringe will continue to invade the healthier vegetative communities in the bushland. Control could be achieved utilising a number of methods, including hand pulling/ grubbing of appropriate species, broad leaf and grass-specific herbicide applications where necessary, and also possibly the complete removal of the road verge top soil. This could be done by scalping of the strip between the road and bollarded Park border (ie. mechanical removal all vegetative material, seeds and corms), followed by mulching and revegetation. In place of the weeds, an attractive and colourful dense border of select local native species could be planted out. The verge would then become an effective buffer between the bushland and the road, providing some protection against further infestation of the bushland.

Monitoring of vegetation in the Park is a priority, particularly during restorative and rehabilitative works. A thorough monitoring programme enables site managers to get an idea of what is happening in the reserve and to evaluate the effectiveness of weed control and revegetation programmes over time. Bi-annual or quarterly vegetation surveys, together with photopoint monitoring (to provide a visual record of changes over time) are two methods recommended to ensure thorough and effective monitoring of vegetation at the site in the long term.

1.0 INTRODUCTION

Wireless Hill Park is one of the most valuable stands of remnant vegetation in the Perth metropolitan region today. Consisting of almost 40 hectares of Class A bushland reserve, the park supports a diverse range of plant and bird species, and also has significant cultural heritage and recreational values.

Recognising the importance of enhancing and maintaining the area's conservation values, the City of Melville has taken an active role in the Park's conservation management since it's vestment in 1969. The City, in association with the local voluntary, community-based Friends of Wireless Hill Park, is currently in the process of implementing the site's 1999 Environmental Management Plan.

In response to Section 3.1.1 and 3.1.2 of the Plan (Recommendations- Flora and Weed Management)[1], the Friends group commissioned this short survey and study in Spring 2002. Specifically the purposes of this report are to

1. Establish background condition of the Park's vegetative communities (species diversity and abundance, extent of weed invasion etc), and
2. Develop an appropriate survey method to facilitate effective strategies for the ongoing monitoring of the Park's vegetation (and therefore the affect of bushland rehabilitation programmes) by the voluntary Friends of Wireless Hill Park group.

2.0 SURVEY SITES

The 16 quadrats surveyed in this study (Section 4.0 – Results and Appendix II – Survey by botanical name) were selected at one each of the 16 areas specified in the 1999 Management Plan, illustrated in the Plan's vegetation associations map. These areas are identified by the vegetation associations defined in the Plan, namely:

1 *Banksia attenuata, B. menziesii*, low open woodland over dwarf *B. menziesii, Macrozamia riedlii, Xanthorrhoea preissii* open shrubland over low closed heath

2a *Eucalyptus marginata/ Corymbia calophylla* open woodland over *B. attenuata/ B. menziesii* woodland over *X. preissii* open shrubland over low open heath and *Ehrharta calycina* grassland

2b *Eucalyptus marginata/ E. calophylla/ B. attenuata/ B. menziesii* low woodland to woodland over closed heath

3 *Allocasuarina fraseriana/ E. marginata* woodland over *Stirlingia latifolia, Mesomelaena stygia* closed heath

4a *E. marginata/ B. attenuata/ B. menziesii* low open woodland over *Macrozamia riedlei* open shrubland over *Stirlingia latifolia* closed heath

4b *B. attenuata/ B. menziesii/ E. marginata* low open woodland over *X. preissii* open shrubland over open heath

4c *B. attenuata/ B. menziesii/ E. marginata* low open woodland over both open and closed heath

5a *B. attenuata/ B. menziesii/ E. marginata* low open woodland over *X. preissii, M. riedlei* tall shrubland over low open heath

5b *B. attenuata/ B. menziesii* low open woodland over low open heath

5ba *B. attenuata/ B. menziesii* low woodland over *Adenanthos cygnorum* tall shrubland over *Lepidospermum scabrum, M. stygia* sedgeland and open heath

5c *E. marginata* mixed low open woodland over *X. preissii* open shrubland over low open heath

6 *A. fraseriana* low open woodland over *A. cygnorum* tall open heath

6a *A. cygnorum* tall open scrub over *M. stygia* open sedgeland and *Jacksonia sericea* open herbland and *Amphipogon turbinatus* grassland

7 *E. marginata/ E. calophylla/ B. attenuata/ B. menziesii/ A. fraseriana* low open forest over closed mixed heath

3.0 SURVEY METHODS

Following two initial training sessions with the group, it quickly became apparent that the detailed, data-heavy survey methods originally applied would not be appropriate for effective long term monitoring by volunteers. A more general, and much faster survey method was subsequently applied to determine coverage and range of species in each quadrat -

1. Mark out a 10 x 10m quadrat within each of the defined areas (ideally at the site of a GPS peg - though the GPS map was not available at the time of this survey and numerous pegs were missing- and mark out with flagging tape).
2. Beginning with the overstorey and working down to ground level, record approximate percentage cover of each individual species in the quadrat (Appendices I and II).

Vegetation condition was estimated according to methods developed in Bronwyn Keighery's 1994 work, *Bushland Plant Survey*, and as conducted by the City of Melville in producing the 1999 Management Plan. Keighery's classification categories, reproduced in the Plan, are as follows:

Pristine
Pristine or nearly so. No obvious signs of disturbance.

Excellent
Vegetation structure intact, disturbance affecting individual species and weeds are non-aggressive species.

Very good
Vegetation structure altered, obvious signs of disturbance.

Good
Vegetation structure significantly altered by very obvious signs of multiple disturbance.

Degraded
Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management.

Completely degraded
Structure of vegetation is no longer intact and area is completely or almost completely without native species.

4.0 RESULTS

4.1 Site condition survey

Overall condition of the park's vegetative features were rated as good to very good (Table 1). Some improvements have been noted at the site since the last condition report was completed in 1999. Notable conservation gains have been made on the Park's northern edge, where the local Friends group has effectively controlled what are understood to have been substantial Geraldton Wax (*Chamelaucium uncinatum*) populations.

VEGETATION ASSOCIATION (based on vegetation association map in the 1999 Management Plan)	VEGETATION CONDITION ASSESSMENT (from 1999 Management Plan)	VEGETATION CONDITION ASSESSMENT (based on October 2002 vegetation survey)
1(white)	Good – very good	Good – very good
1(orange)	Good – very good	Good
2a	Good – very good	Good – very good
2b	Good	Good – very good
3	Very good	Good - very good
4a (yellow)	Very good – excellent	Very good - excellent
4a (green)	Very good – excellent	Very good
5a	Good – very good	Good – very good
5b	Good – very good	Good – very good
5ba	Good	Very good
5c	Good – very good	Very good
6	Degraded - good	Good
6a	Degraded - good	Degraded – good
7	Very good - excellent	Very good - excellent

TABLE 1: VEGETATION CONDITION ASSESSMENT

4.2 Vegetation survey

A total of 120 different plant species were recorded during the course of this survey, conducted in mid - late October 2002. This figure represents less than a third of the total plant species recorded in the 1999 Management Plan. A number of reasons may be responsible for this discrepancy (Section 5.2 – Monitoring the site), including:

- Time of the year (additional surveys should be carried out in Summer, Autumn and late Winter/ early Spring, to ensure representation of a majority of species).
- Time and budget constraints (there was sufficient time to survey only one quadrat per defined area).

Of the species noted at the time of the survey (during mid to late October) some 15% were weeds. It is expected that this figure would be higher in late winter/ early spring, when non-native grasses such as *Bromus diandrus* (Great Brome), *Ehrharta calycina* (Perennial veldt grass) and a range of other winter weeds are actively growing and flowering. Conversely, the ratio of non-native to native species would be expected to be far lower in mid Summer, when native grasses tend to be more active (and therefore more readily identified).

Time of year aside, there is absolutely no question that weed invasion is a major issue for site managers at Wireless Hill, who must maintain control of these weed populations in order to facilitate the long term viability of native vegetation communities at the site (Section 5.1 – Vegetation enhancement and maintenance). Weed species observed during this survey, and which were noted as particularly virulent, include

- *Gladiolus sp.* (Gladiola) - appeared in 11 out of 16 quadrats
- *Hypochaerus sp.* (Flat weeds) - appeared in 15 quadrats
- *Romulea rosea* (Guildford grass) - appeared in 11 quadrats
- *Ursinea anthemoides* (Ursinea) - appeared in 13 quadrats
- *Watsonia bulbillifera* (Watsonia) - appeared in 10 quadrats

The spread of *Ehrharta calycina* (perennial veldt grass) appears to have declined significantly since the 1999 vegetation survey, when the species was noted to be "heavily infesting" some areas of the Park. However, early spring surveys (when this species is most active) should be conducted to determine whether regular spraying of the site is effectively keeping this species under control (Section 5.2 – Monitoring the site). Geraldton wax populations have also been significantly reduced since 1999, with only a few scattered individuals remaining on the Park's northern edge (Section 5.1 – Vegetation enhancement and maintenance). As in the 1999 Management Plan, Gladioli and Watsonia continue to be a major problem throughout the Reserve.

5.0 DISCUSSION AND RECOMMENDATIONS

5.1 Vegetation enhancement and maintenance

Maintaining and enhancing the quality of native vegetation at Wireless Hill will require ongoing weed control and revegetation programmes. Weed invasion is a serious issue which should be addressed at the outset of any management programme, as there is little point in attempting revegetation in any area of the park that is still colonised by significant populations of weeds. In some instances it may be necessary to conduct weed control for several years before any follow-up works are attempted.

Methods employed to control weed populations will vary from species to species. Manual control methods (such as grubbing, hand-pulling, and seed head removal) should always be utilised in preference to chemical solutions, however spraying is an only option in some cases (eg. *Ehrharta calycina,* or Perennial veldt grass). Extreme caution should be used when spraying herbicides in bushland areas – chemical drift can be a major issue, so action should be taken in order to minimise this risk.

In some cases, regardless of attention to risk reduction, chemicals (such as Fusilade – a grass specific herbicide used in the control of veldt grass) will impact on non-target species (in this case, native grasses). To minimise this risk, spraying should be timed to have the greatest impact on the target population and the least impact on co-existing native species. For example, spraying for Perennial veldt grass should be conducted in late winter/ early spring, when this species is at its most active stage of growth and when native grasses (which are generally most active in summer) will be least damaged by herbicide application.

Weed species occurring in low densities or as scattered individuals should be removed immediately, preventing them from becoming established (or re-established) in the Park. The remaining species, which are more entrenched, will be controlled only through a concentrated programme of hand weeding and chemical treatment conducted over several years. Given the range of weed species present at the site, an integrated attack combining physical removal, natural suppession/ containment and, where necessary, chemical control, will provide the most efficient and sustainable solutions for weed management in the long term.

As recommended in the 1999 Management Plan, the Bradley method of natural area restoration should be utilised to create a more efficient approach to Park management. This would involve focussing efforts on those particular areas of the Park that have a relatively intact vegetation structure, and that have been minimally impacted by fire, erosion, weed invasion and other disturbances over the years. Two such areas in the Park are 4a and 7, with both rating very good – excellent in the condition survey (Table 1).

Also mentioned in the Plan, and considered of vital importance here, is the heavily infested weedy fringe of the Reserve. Whilst the fringe does not fall into the Bradley category for priority restoration sites, these is no doubt that it does require attention. Without some control, this weedy fringe will continue to invade the healthier vegetative communities in the bushland. Control could be achieved utilising a number of methods, including hand pulling/ grubbing of appropriate species, broad leaf and grass-specific herbicide applications where necessary, and also possibly the complete removal of the road verge top soil. This could be done by scalping of the strip between the road and bollarded Park border (ie. mechanical removal all vegetative material, seeds and corms), followed by mulching and revegetation. In place of the weeds, an attractive and colourful dense border of select local native species could be planted out. The verge would then become an effective buffer between the bushland and the road, providing some protection against further infestation of the bushland.

5.2 Monitoring the site

Monitoring of vegetation in the Park is a priority, particularly during restorative and rehabilitative works. A thorough monitoring programme enables site managers to get an idea of what is happening in the reserve and to evaluate the effectiveness of weed control and revegetation programmes over time. The following methods are recommended to ensure thorough and effective monitoring of vegetation at the site in the long term:

- Vegetation surveys

  In order to establish the condition and diversity of vegetation in bushland and changes in the same over time, surveys should be conducted between two and four times per annum. Ideally these would be carried out in
  - late winter/ early spring,
  - late spring/ early summer
  - late summer/ early autumn
  - late autumn/ early winter

  Because the Wireless Hill site is managed by a group of community-based volunteers (ie. different people conducting surveys in different years), the methods utilised must be simple, fast and easily replicable.

The method utilised for this survey (described in Section 3.0 – survey methods) is ideal for this purpose. Previous work done by the group in marking out GPS sites could be utilised to identify specific quadrats within defined vegetative communities (as per Management Plan, 1999), and ensure that the survey can be accurately replicated season after season.

- Photopoint monitoring

  Photopoint monitoring is one excellent method of recording general, visual changes in vegetation over time. This could be done by setting up two monitoring points per defined vegetative community area, with different views giving a good impression of vegetation at each site. Points should be permanently marked utilising wooden or steel pegs (log with GPS if possible) and photographs should be taken from this point. Three or four different photographs can be taken from each point, providing notes are made regarding the direction of the camera (eg. Point 1, x east, x north, facing west; Point 1, x east, x north, facing south etc.). Photopoint monitoring should be carried out at the same time as the vegetation surveys.

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APPENDIX 5

ECOSCAPE WEED MAPS 2005

City of Melville

Perennial Grasses in Wireless Hill

Monday, 12 June 2006 | 1:6645

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N

City of Melville

Annual Grasses in Wireless Hill

Monday, 12 June 2006 | 1:6645

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N

— City of —
Melville

Weeds in Wireless Hill

Navy Blue – Geraldton Wax
Light Blue – Euphorbia spp
Pink - Freesia
Brown - Pigface

Monday, 12 June 2006 | 1:6645

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N

	Weeds in Wireless Hill	Monday, 12 June 2006	1:6645	N

	Fumaria	DISCLAIMER - Whilst the City of Melville makes every effort to ensure the information contained herein is up-to-date and accurate it accepts no liability for any loss or damage howsoever caused as a result of reliance upon information contained in this document.	

— City of —	**Weeds in Wireless Hill**	Monday, 12 June 2006	1:6645	N

	Gladiolus spp	DISCLAIMER - Whilst the City of Melville makes every effort to ensure the information contained herein is up-to-date and accurate it accepts no liability for any loss or damage howsoever caused as a result of reliance upon information contained in this document.	

City of Melville	**Extent of Lachenalia reflexa in Wireless Hill In 2005 found by Ecoscapes**	Monday, 12 June 2006	1:6645	N
		DISCLAIMER - Whilst the City of Melville makes every effort to ensure the information contained herein is up-to-date and accurate it accepts no liability for any loss or damage howsoever caused as a result of reliance upon information contained in this document.		

	Weeds in Wireless Hill	Monday, 12 June 2006	1:6645	N

	Lupins	DISCLAIMER - Whilst the City of Melville makes every effort to ensure the information contained herein is up-to-date and accurate it accepts no liability for any loss or damage howsoever caused as a result of reliance upon information contained in this document.	

— City of —	**Weeds in Wireless Hill**	Monday, 12 June 2006	1:6645	N

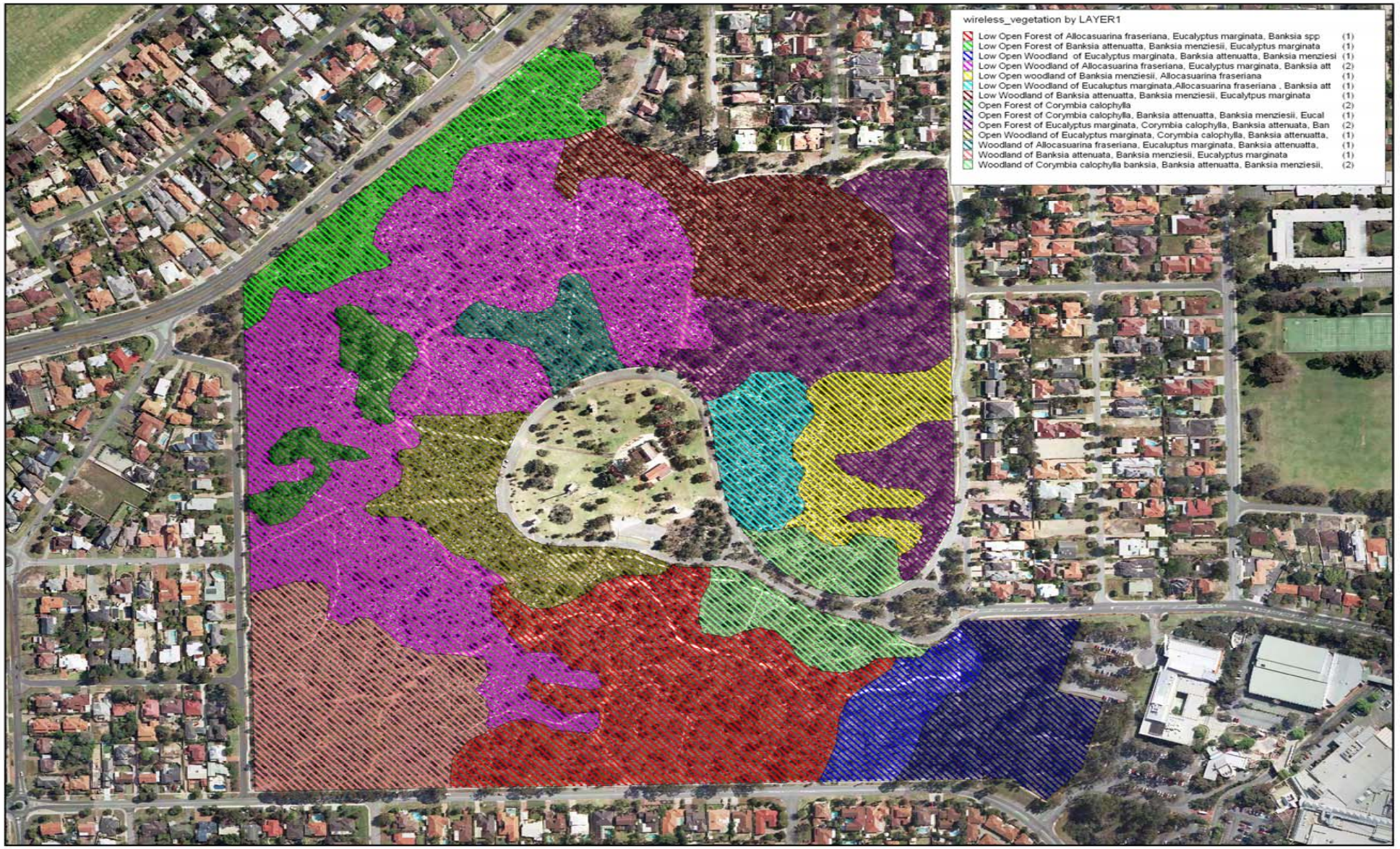
	Watsonia	DISCLAIMER - Whilst the City of Melville makes every effort to ensure the information contained herein is up-to-date and accurate it accepts no liability for any loss or damage howsoever caused as a result of reliance upon information contained in this document.	

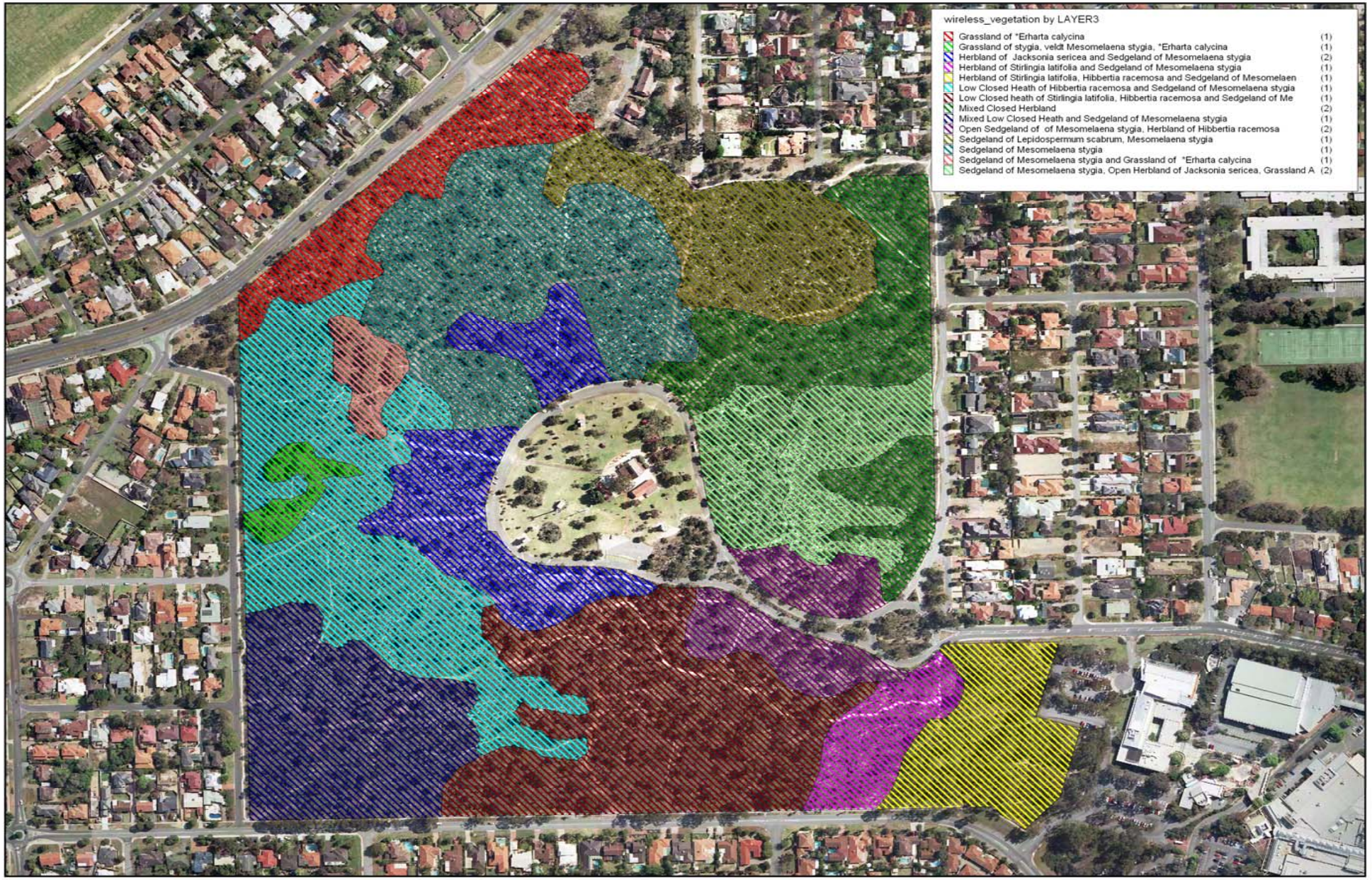
	Weeds in Wireelss Hill	Monday, 12 June 2006	1:6645	N

	chamaecytisus palmensis	DISCLAIMER - Whilst the City of Melville makes every effort to ensure the information contained herein is up-to-date and accurate it accepts no liability for any loss or damage howsoever caused as a result of reliance upon information contained in this document.	

APPENDIX 6

ECOSCAPE BUSHLAND CONDITION AND VEGETATION COMMUNITY MAPS 2005.


wireless_vegetation by LAYER1
Low Open Forest of Allocasuarina fraseriana, Eucalyptus marginata, Banksia spp (1)
Low Open Forest of Banksia attenuatta, Banksia menziesii, Eucalyptus marginata (1)
Low Open Woodland of Eucalyptus marginata, Banksia attenuatta, Banksia menziesi (1)
Low Open Woodland of Allocasuarina fraseriana, Eucalyptus marginata, Banksia att (2)
Low Open woodland of Banksia menziesii, Allocasuarina fraseriana (1)
Low Open Woodland of Eucaluptus marginata,Allocasuarina fraseriana , Banksia att (1)
Low Woodland of Banksia attenuatta, Banksia menziesii, Eucalytpus marginata (1)
Open Forest of Corymbia calophylla (2)
Open Forest of Corymbia calophylla, Banksia attenuatta, Banksia menziesii, Eucal (1)
Open Forest of Eucalyptus marginata, Corymbia calophylla, Banksia attenuata, Ban (2)
Open Woodland of Eucalyptus marginata, Corymbia calophylla, Banksia attenuatta, (1)
Woodland of Allocasuarina fraseriana, Eucaluptus marginata, Banksia attenuatta, (1)
Woodland of Banksia attenuata, Banksia menziesii, Eucalyptus marginata (1)
Woodland of Corymbia calophylla banksia, Banksia attenuatta, Banksia menziesii, (2)


wireless_vegetation by LAYER3
Grassland of *Erharta calycina (1)
Grassland of stygia, veldt Mesomelaena stygia, *Erharta calycina (1)
Herbland of Jacksonia sericea and Sedgeland of Mesomelaena stygia (2)
Herbland of Stirlingia latifolia and Sedgeland of Mesomelaena stygia (1)
Herbland of Stirlingia latifolia, Hibbertia racemosa and Sedgeland of Mesomelaen (1)
Low Closed Heath of Hibbertia racemosa and Sedgeland of Mesomelaena stygia (1)
Low Closed heath of Stirlingia latifolia, Hibbertia racemosa and Sedgeland of Me (1)
Mixed Closed Herbland (2)
Mixed Low Closed Heath and Sedgeland of Mesomelaena stygia (1)
Open Sedgeland of of Mesomelaena stygia, Herbland of Hibbertia racemosa (2)
Sedgeland of Lepidospermum scabrum, Mesomelaena stygia (1)
Sedgeland of Mesomelaena stygia (1)
Sedgeland of Mesomelaena stygia and Grassland of *Erharta calycina (1)
Sedgeland of Mesomelaena stygia, Open Herbland of Jacksonia sericea, Grassland A (2)

APPENDIX 7

WIRELESS HILL WILDFIRE RESPONSE PLAN

<table>
<tr><td colspan="10">WIRELESS HILL PARK WILDFIRE RESPONSE PLAN</td></tr>
<tr><td colspan="5"></td><td colspan="5">IMT CONTACTS:</td></tr>
<tr><td colspan="5">CURRENT AT: 28/10/2003</td><td colspan="5"></td></tr>
<tr><td colspan="5">LOCATION: Streetsmart Map 402 ref B10 Almondbury Road, Ardross
AMG ref 388000mE 6455000mN</td><td colspan="5"></td></tr>
<tr><td colspan="5">AREA: 40 Ha</td><td colspan="5">FIREGROUND DECISIONS:</td></tr>
<tr><td colspan="5" rowspan="2">HMA: WA Fire & Rescue INCIDENT NAME: Wireless Hill Park
Bush Plan Ref: No: Date:</td><td>Activity</td><td colspan="2"></td><td>Contact Position & Contact Name</td><td>Done √</td><td>Time</td></tr>
<tr><td>Water Bombers requested (NO FOAM PLEASE)</td><td>Y</td><td>N</td><td>Incident Controller</td><td></td><td></td></tr>
<tr><td colspan="3">COMCEN CONTACTS:</td><td>Done√</td><td>Time</td><td rowspan="2">Environmental Officer (CALM)</td><td rowspan="2">Y</td><td rowspan="2">N</td><td rowspan="2"></td><td rowspan="2"></td><td rowspan="2"></td></tr>
<tr><td>FRS FSM Canning Murdoch</td><td>0407477640</td><td></td><td></td><td></td></tr>
<tr><td rowspan="2"></td><td rowspan="2"></td><td rowspan="2"></td><td rowspan="2"></td><td rowspan="2"></td><td>Communication Plan</td><td>Y</td><td>N</td><td>Incident Controller</td><td></td><td></td></tr>
<tr><td>City of Melville</td><td>9364 0666</td><td>Traffic Plan</td><td>Y</td><td>N</td><td>Incident Controller</td><td></td><td></td></tr>
<tr><td>LGA Emergency A/H</td><td>0418 943 219</td><td></td><td></td><td></td><td>Mop Up & Patrol to CALM Standards</td><td>Y</td><td>N</td><td>Incident Controller</td><td></td><td></td></tr>
<tr><td colspan="5">Initial Response Turnout</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="5">Very High & Extreme FDI: O’Connor & Kensington Fire Station Pumps and LT’s HELLITAKS</td><td>Declared ‘SAFE’</td><td>Y</td><td>N</td><td>Incident Controller</td><td></td><td></td></tr>
<tr><td colspan="5">Other FDI’s: O’Connor Fire Station Pump and LT</td><td colspan="5">RECOVERY ACTIONS:</td></tr>
<tr><td>Special Risks:</td><td colspan="4"></td><td>Activity</td><td colspan="2"></td><td></td><td></td><td></td></tr>
<tr><td colspan="5">Identified Flora priority 3 area (5830 refer plan)</td><td>Incident Handover</td><td>Y</td><td>N</td><td></td><td></td><td></td></tr>
<tr><td colspan="5">Surrounding residential properties</td><td colspan="5">Briefings:</td></tr>
<tr><td colspan="5">Domestic evaporative air conditioners</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
</table>

Historical communication buildings are located with-in the park boundaries..				Local Govt Authority	Y	N	City of Melville 9364 0666		
Vehicles to remain on existing breaks and paths to reduce soil, flora and fauna damage Contain fire using existing fire breaks and tracks Do not create new mineral earth breaks unless approved by Melville environmental officer				Environmental Officer	Y	N	Jackie Stansfield 9364 0283 After Hours Call 0418943219		
				Friends of Wireless Hill Park	Y	N			
				Special Requests (see	Y	N			
				comments below)					
Environment Considerations:				COMMENTS:					Action
				Off road vehicle use will cause more damage to bushland environment than the fire will. If fire can be contained, and is no threat to houses/people, please let it burn to a path or road.					
Flora and Fauna	5830(refer to plan) contains Priority 3 Flora; Jacksonia sericea and Phlebocarya filifolia.			Preserve large trees wherever possible, they provide habitat whether dead or not, if left standing and are irreplaceable once clear-felled.					Req'd
Considerations:									
Hazards:	Old transmission tower spikes Soft soil on sloping ground Traffic control required on Canning Hwy for smoke hazard Concrete blocks 1m square located through the park								
Vulnerable Property:	All surrounding domestic dwellings and centrally built communication buildings. Historic dwellings in Hickey St.			AUTHORISED BY:					
				Name	Position		Signature	Date	Time
Access:	Along roads surrounding park. Almondury Rd provides sealed road access. See map Park track access for L/T marked on map								

APPENDIX 8

WIRELESS HILL BIRD SURVEY DATA

BIRDS AUSTRALIA, PBP. Bird surveys in selected Perth metropolitan reserves.
Part B: Site report pages 118-119, Wireless Hill data
C.A. Cole 2003

Site Name: Wireless Hill Park		
Site Location Ardross	**Local Government Authority** City of Melville	**Area (ha)** 35.2ha
Vegetation Complex Karrakatta Complex – Central and South		**Bird Survey Information** ***Survey period reported***: Nov 2002 – Oct 2003 ***Survey frequency***: monthly ***Total no. surveys***: 13
Natural Area ID no: 8260	**Bush Forever Site no:** 336	

Bird species recorded in survey period * denotes introduced species	Breeding on survey site	Maximum number recorded (water dependent species only)	Frequency of occurrence		Significant species (Bush Forever)
			No. (number surveys in which recorded)	% of surveys	
Collared Sparrowhawk			1	8	Category 4
Painted Button-quail			1	8	Category 4
Silver Gull			1	8	
Rock Dove*			5	38	
Laughing Turtle-Dove*	Possible		12	92	
Spotted Turtle-Dove*			6	46	
Common Bronzewing			1	8	Category 3
Carnaby's (Short-billed) Black-Cockatoo			3	23	Category 1,4
Galah			2	15	
Rainbow Lorikeet*			6	46	
Australian Ringneck	Possible		9	69	
Red-capped Parrot	Possible		9	69	
Laughing Kookaburra			2	15	
Rainbow Bee-eater	Confirmed		5	38	
Striated Pardalote	Confirmed		2	15	
Western Gerygone			3	23	
Inland Thornbill			3	23	Category 3
Red Wattlebird	Possible		12	92	
Little Wattlebird	Confirmed		8	62	Category 4
Singing Honeyeater			12	92	
Brown Honeyeater			13	100	
New Holland Honeyeater			2	15	Category 4
White-cheeked Honeyeater	Possible		8	62	Category 4
Tawny-crowned Honeyeater			1	8	Category 4
Western Spinebill			1	8	
Varied Sittella			1	8	Category 3
Rufous Whistler			3	23	
Magpie-lark			7	54	
Willie Wagtail			6	46	
Black-faced Cuckoo-shrike			10	77	
Grey Butcherbird			8	62	
Australian Magpie	Confirmed		11	85	
Australian Raven	Possible		11	85	
Welcome Swallow			1	8	
Tree Martin			4	31	
Silvereye	Possible		2	15	
Total species = 35	**Total = 11**				**Total = 10**

Observers: Wynton Maddeford, Tom Spalding.

Other sources of bird survey information
Birds Australia national Bird Atlas database: 11 surveys, 29 species
Database of WA Birds: 2 surveys, 25 species.
City of Melville (ND): 43 species.

Additional significant bird species recorded in other sources
Birds Australia Bird Atlas database:
Whistling Kite, Yellow-rumped Thornbill

Database of WA Birds: White-naped Honeyeater

City of Melville, ND: Collared Sparrowhawk, Yellow-rumped Thornbill. The Brown-headed Honeyeater records in this report are a highly unlikely occurrence and may refer to White-naped Honeyeater.

Two of these species (Whistling Kite and Collared Sparrowhawk) are mobile species and may periodically utilise the site. While generally regarded as sedentary, Yellow-rumped Thornbill may be locally mobile, and may utilise the site at times. However, it is also possible that the species is now locally extinct. White-naped Honeyeater is a mobile species now uncommon to rare on the Swan Coastal Plain.

GENERAL COMMENTS
A total of 35 bushbirds, ten of which are significant, has been recorded at Wireless Hill Park. Three sedentary species regarded as significant under Bush Forever have been recorded in the reserve. These are Painted Button-quail, Common Bronzewing and Inland Thornbill. Painted Button-quail is now patchily distributed in larger remnants on Swan Coastal Plain. .Mobile species recorded at Wireless Hill Park and regarded as significant under Bush Forever are Carnaby's Black-Cockatoo, 4 honeyeaters, including Tawny-crowned Honeyeater, and Varied Sittella. Remnant-dependent species recorded on the site are Western Gerygone and Rufous Whistler.

The endangered Carnaby's Black-Cockatoo has also been recorded at this reserve. Sites such as Wireless Hill Park may form part of a valuable network of habitat remnants providing food resources for the mobile Carnaby's Black-Cockatoo on the Swan Coastal Plain. Currently, the pine plantations at Gnangara provide a food resource for Cockatoos over-summering in the Perth Metropolitan Region. The impact of the future staged removal of the pines at Gnangara is as yet uncertain (Cale, 2003). It may be important for the survival of the Cockatoos that reserves such as Wireless Hill Park are not only retained, but also that native vegetation is maintained in good condition.

APPENDIX 9

FLORA OF WIRELESS HILL

Flora Species List from 1998 Management Plan

Family	Species	Subspecies/ Variety	Common Name/S	Origin
Aizoaceae	*Carpobrotus edulis*	-	Pigface	Overseas
Amaranthaceae	*Ptilotus drummondii*	-	Narrowleaf Mulla Mulla	Local
	Ptilotus polystachyus	-	Mulla Mulla	Local
Apacridiaceae	*Schinus terebinthifoloia*		Brazilian pepper, Japanese pepper	Overseas
Anthericaceae	*Arnocrinum preissii*	-		Local
	Caesia parviflora	-		Australia
	Chamaescilla corymbosa	-	Blue Squill	Local
	Chamaescilla spiralis	-		WA
	Coronotheca micrantha	-		Local
	Corynotheca micrantha	*micrantha*		Local
	Johnsonia pubescens	-		Local
	Laxmannia squarrosa	-		Local
	Sowerbaea laxiflora	-	Purple Tassels or Vanilla Lily	Local
	Thysanotus arenarius	-		Local
	Thysanotus multiflorus	-	Many-Flowered Fringe Lily	Local/WA
	Thysanotus patersonii	-		Local
	Thysanotus sparteus	-		Local
	Thysanotus thyrsoideus	-		Local
	Thysanotus triandrus	-		Local
	Tricoryne elatior	-	Yellow Autumn Lily	Local
Apiaceae	*Eryngium pinnatifidum*	-		Local
	Eryngium rostratum	-	Blue Devil	
	Trachymene pilosa	-	Native Turnip	Local
	Xanthosia huegelii	-		Local

Family	Species	Subspecies/ Variety	Common Name/S	Origin
Apocynaceae	*Nerium oleander*		Oleander	Overseas
Asteraceae (Compositae)	*Arctotheca calendula*	-	Cape weed	Overseas
	Conyza bonariensis		Flaxleaf fleabane	Overseas
	Brachycome iberidifolia	-		Local
	Gazania linearis		Gazania	Overseas
	Helichrysum cordatum	-	Tangle daisy	Local
	Hypochaeris glabra	-	Smooth Catsear	Overseas
	Lagenifera huegelii	-	Coarse Lagenifera	Local
	Olearia elaeophila	-		Local
	Osteospermum clandestinum	-	Stinking Roger	Overseas
	Ozothamnus cordatus	-		Local
	Podotheca angustifolia	-	Sticky longheads	Local
	Podotheca canescens	-		
	Podotheca chrysantha	-		Local
	Podotheca gnaphalioides	-	Golden Longheads	Local
	Senecio lautus	-		Local
	Ursinia anthemoides	-	Ursinia	Overseas
	Waitzia suaveolens	-		Local
Asteraceae (Compositeae)	*Asteridea pulverulenta*	-		Local
Brassicaceae (Cruciferae)	*Heliophila pusilla*	-	Wild Radish	Overseas
	Stenopetalum robustum	-		Local
Campanulaceae	*Wahlenbergia capensis*	-	Cape blue-bell	Overseas
	Wahlenbergia preissii	-		Local
Caryophyllaceae	*Petrorhagia velutina*	-	Velvet Pink	Overseas
	Silene gallica	-	French catchfly	Overseas
Casuarinaceae	*Allocasuarina fraseriana*	-	Common Sheoak	Local

Family	Species	Subspecies/ Variety	Common Name/S	Origin
	Allocasuarina humilis	-	Dwarf Sheoak	Local
Colchicaceae	*Burchardia umbellata*	-	Milkmaids	Local
Cyperaceae	*Isolepis marginata*	-	Coarse Club-rush	Overseas
	Lepidosperma angustatum	-		Local
	Lepidosperma scabrum	-		Local
	Lachenalia reflexa			Overseas
	Mesomelaena pseudostygia	-		Local
	Mesomelaena stygia	-	Telegraph rush	Local
	Schoenus curvifolius	-		Local
	Tetraria octandra	-		Local
Dasypogonaceae	*Acanthocarpus preissii*	-	Prickle Lily	Local
	Calectasia cyanea	-	Blue Tinsel Lily	Local
	Dasypogon bromeliifolius	-	Pineapple bush	Local
	Lomandra caespitosa	-	Tufted Mat Rush	Local
	Lomandra hermaphrodita	-		Local
	Lomandra nigricans	-		Local
	Lomandra odora	-		Local
	Lomandra preissii	-		Local
	Lomandra suaveolens	-		Local
Dilleniaceae	*Hibbertia glaberrima (subvaginata)*	-		Local
	Hibbertia huegelii	-		Local
	Hibbertia hypericoides	-	Yellow Buttercups	Local
	Hibbertia racemosa	-	Stalked Guinea Flower	Local
Droseraceae	*Drosera erythrorhiza*	-	Red Ink Sundew	Local
	Drosera macrantha	-	Bridal Rainbow	Local
	Drosera menzesii	-		
	Drosera paleacea	-	Dwarf Sundew	Local
	Drosera penicillaris	-	Pink Rainbow	Local
	Drosera stolonifera	-	Leafy Sundew	Local

Family	Species	Subspecies/ Variety	Common Name/S	Origin
	Drosera stolonifera	*porrecta*		Local
Epacridaceae	*Astroloma ciliatum*	-		Local
	Astroloma macrocalyx	-		Local
	Astroloma pallidum	-		Local
	Conostephium pendulum	-	Pearl Flower	Local
	Conostephium preissii	-		Local
	Leucopogon propinquus	-		Local
	Leucopogon racemulosus	-		Local
Euphorbiaceae	*Monotaxis grandiflora*	-		Local
	Phyllanthus calycinus	-		Local
Fabaceae (Papilionaceae)	*Bossiaea eriocarpa*	-		Local
	Chamaecytisus palmensis		Tagasaste	Overseas
	Daviesia aphylla	-		
	Daviesia decurrens	-		Local
	Daviesia divaricata	-		Local
	Daviesia incrassata	-		Local
	Daviesia juncea	-		
	Daviesia nudiflora	-		Local
	Daviesia pectinata	-		
	Daviesia physodes	-		Local
	Daviesia triflora	-		Local
	Gompholobium tomentosum	-	Hairy Yellow Wedge Pea	Local
	Hardenbergia comptoniana	-	Native Wisteria	Local
	Hovea trisperma	-	Common Hovea	Local
	Isotropis cuneifolia	-	Granny Bonnets or Lambs Poison	Local
	Jacksonia alata	-		WA
	Jacksonia furcellata	-	Grey Stinkwood	Local
	Jacksonia sericea	-		Local
	Jacksonia sternbergiana	-	Stinkwood	Local
	Kennedia prostrata	-	Running Postman	Local
	Lupinus cosentinii	-	W.A blue lupin/Sandplain Lupin	Overseas
	Nemcia capitatum	-	Bacon and Eggs	Local

Family	Species	Subspecies/ Variety	Common Name/S	Origin
	Oxylobium linearifolium	-		
	Trifolium angustifolium	-	Narrow leaf clover	Overseas
	Trifolium arvense	-	Hare's Foot Clover	Overseas
Geraniaceae	*Pelargonium capitatum*	-	Rose Geranium	Overseas
	Erodium botrys		Long storksbill	Overseas
Goodeniaceae	*Dampiera linearis*	-	Common Blue Dampiera	Local
	Lechenaultia floribunda	-	Free - Flowering Lechenaultia	Local
	Scaevola canescens	-		Local
	Scaevola paludosa	-		Local
Haemodoraceae	*Anigozanthos humilis*	-	Catspaw	Local
	Anigozanthos manglesii	-	Red and Green Kangaroo Paw	Local
	Conostylis aculeata	-	Prickly Conostylis	Local
	Conostylis aurea	-	Golden Conostylis	Local
	Conostylis juncea	-		Local
	Conostylis setigera	-	Bristly Cottonhead	Local
	Haemodorum laxum	-		Local
	Haemodorum spicatum	-	Bloodroot	Local
	Phlebocarya ciliata	-		Local
	Phlebocarya filifolia	-		Local
Haloragaceae	*Gonocarpus sp.*	-		
Hyacinthaceae	*Lachenalia reflexa*	-		Overseas
Iridaceae	*Freesia refracta*	-	Freesia	Overseas
	Gladiolus caryophyllaceus	-	Pink Gladioli	Overseas
	Patersonia occidentalis	-	Purple Flags	Local
	Romulea rosea	-	Guildford grass	Overseas
	Watsonia bulbillifera	-	Watsonia	Overseas
Juncaceae	*Luzula meridionalis*	-	Field woodrush	Local
Lamiaceae	*Hemiandra pungens*	-	Snake Bush	Local

Family	Species	Subspecies/ Variety	Common Name/S	Origin
Liliacaeae	*Trachyandra divaricata*	-		Overseas
Lobeliaceae	*Isotoma hypocrateriformis*	-		Local
	Lobelia gibbosa	-		Local
	Lobelia tenuior	-	Slender Lobelia	Local
Loranthaceae	*Nuytsia floribunda*	-	Australian Christmas Tree	Local
Meliaceae	*Melia azederach*		Cape lilac	WA/Overseas
Mimosaceae	*Acacia huegelii*	-		Local
	Acacia pulchella	-	Prickly Moses	Local
	Acacia saligna	-	Orange Wattle	Local
	Acacia sessilis	-		Local
	Acacia stenoptera	-	Narrow Winged Wattle	Local
	Acacia willdenowiana	-	Grass Wattle	Local
Molluginaceae	*Macarthuria australis*	-		Local
Myrtaceae	*Baeckea camphorosmae*	-	Camphore Myrtle	Local
	Baeckea sp	-		
	Calytrix flavescens	-	Summer Starflower	Local
	Calytrix fraseri	-	Pink Summer Calytrix	Local
	Chamelaucium uncinatum	-	Geraldton Wax	WA
	Corymbia calophylla	-	Marri	Local
	Corymbia maculata		Spotted Gum	Australia
	Corymbia citrodora		Lemon scented gum	WA/Australia
	Eremaea pauciflora	-		Local
	Eucalyptus erythocorys			WA
	Eucalyptus caesia		Gungurru	WA
	Eucalyptus cladocalyx		Sugar gum	Australia
	Eucalyptus marginata	-	Jarrah	Local
	Hypocalymma robustum	-	Swan River Myrtle	Local
	Melaleuca scabra	-	Rough Honeymyrtle	Local
	Regelia inops	-		Local

Family	Species	Subspecies/ Variety	Common Name/S	Origin
	Scholtzia involucrata	-	Spiked Scholtzia	Local
	Verticordia densiflora	-		Local
Orchidaceae	*Burnettia nigricans*	-	Red Beaks	Local
	Caladenia arenicola	-	Carousel Spider Orchid	Local
	Caladenia deformis	-	Blue Fairy Orchid	Local
	Caladenia discoidea	-	Bee orchid	Local
	Caladenia flava	-	Cowslip Orchid	Local
	Caladenia gemmata	-	Blue China Orchid	Local
	Caladenia huegelii	-	Grand Spider Orchid	Local
	Caladenia latifolia	-	Pink Fairies	Local
	Caladenia longicauda	*calcigera ms.*	White Spider Orchid	Local
	Caladenia patersonii	-		Australia
	Cyanicula deformis	-	Blue Fairy Orchid	Local
	Diuris longifolia	-	Donkey Orchid	Local
	Eriochilus dilatatus	-	Bunny Orchid	Local
	Lyperanthus nigricans	-	Red Beak Orchid	Local
	Lyperanthus serratus	-	Rattle Beaks	Local
	Microtis unifolia	-		Local
	Prasophyllum hians	-	Yawning Leak Orchid	Local
	Prasophyllum parvifolium	-	Autumn Leak Orchid	Local
	Pterostylis aff. sanguinea	-	Banded Greenhood	Local
	Pterostylis recurva	-	Jug Orchid	Local
	Pterostylis vittata	-	Banded Greenhead	Local
Orobanchaceae	*Orobanche minor*	-	Lesser Broomrape	Overseas
Oxalidaceae	*Oxalis glabra*	-		Overseas
	Oxalis pes-caprae	-	Soursob	Overseas
Phormiaceae	*Dianella revoluta*	-	-	WA
	Dianella divaricata			Local
Poaceae	*Amphipogon turbinatus*	-		Local
	Avena barbata	-	Bearded Oat Grass	Overseas
	Briza maxima	-	Blowfly Grass	Overseas
	Briza minor	-	Shiver Grass	Overseas

Family	Species	Subspecies/ Variety	Common Name/S	Origin
	Bromus diandrus		Great brome	Overseas
	Cenchrus echinatus		Mossman River Grass	Overseas
	Eragrostis curvula		African Lovegrass	Overseas
	Ehrharta calycina	-	Perennial Veldt Grass	Overseas
	Lagurus ovatus	-	Hare's Tail Grass	Overseas
	Neurachne alopecuroidea	-	Foxtail Mulga Grass	Local
	Pennisetum setaceum		Fountain Grass	Overseas
	Pennisetum villosum	-	Feathertop	Overseas
	Stipa compressa	-		Local
Polygalaceae	*Comesperma calymega*	-		Local
Portulacaceae	*Calandrinia corrigioloides*	-		Local
	Calandrinia liniflora	-		Local
	Calandrinia sp.	-		
Primulaceae	*Anagallis arvensis*	-	Blue Pimpernel	Overseas
Proteaceae	*Adenanthos cygnorum*	-	Wooly Bush	Local
	Adenanthos cygnorum	*cygnorum*	Wooly Bush	Local
	Banksia attenuata	-	Candle Banksia	Local
	Banksia grandis	-	Bull Banksia	Local
	Banksia ilicifolia	-		Local
	Banksia menziesii	-	Firewood Banksia	Local
	Conospermum triplinervium	-	Smoke Bush	Local
	Dryandra nivea	-	Couch Honeypot	Local
	Dryandra sessilis	-	Parrot Bush	Local
	Grevillea vestita	-		Local
	Hakea laurina			WA
	Hakea prostrata	-	Harsh Hakea	Local
	Persoonia saccata	-		Local
	Petrophile linearis	-	Pixie Mops	Local
	Petrophile macrostachya	-		Local
	Stirlingia latifolia	-	Blueboy	Local
	Synaphea spinulosa	-		Local
Restionaceae	*Hypolaena exsulca*	-		Local
	Lepidobolus	-		WA

Family	Species	Subspecies/ Variety	Common Name/S	Origin
	chaetocephalus			
	Loxocarya fasciculata	-		Local
	Loxocarya flexuosa	-		Local
	Lyginia barbata	-		Local
Rubiaceae	*Opercularia vaginata*	-	Dog Weed	Local
Rutaceae	*Boronia ramosa*	*anethifolia*		Local
	Eriostemon spicatus	-	Pepper and Salt	Local
Scrophulariaceae	*Dischisma capitatum*	-	Woolly-headed Dischisma	Overseas
Stackhousiaceae	*Tripterococcus brunonis*	-	Winged Stackhousia	Local
Stylidiaceae	*Levenhookia pusilla*	-		Local
	Levenhookia stipitata	-	Common Stylewort	Local
	Stylidium amoenum	-	Lovely Triggerplant	Local
	Stylidium brunonianum	-	Pink Fountain Triggerplant	Local
	Stylidium brunonianum	*brunonianum*	Pink Fountain Triggerplant	Local
	Stylidium carnosum	-	Fleshy-Leaved Triggerplant	Local
	Stylidium piliferum	-	Common Butterfly Triggerplant	Local
	Stylidium piliferum	*piliferum*		Local
	Stylidium schoenoides	-	Cow Kicks	Local
Thymelaeaceae	*Pimelea rosea*	-	Rose Banjine	Local
	Pimelea sulphurea	-	Yellow Banjine	Local
Violaceae	*Hybanthus calycinus*	-	Wild Violet	Local
Xanthorrhoeaceae	*Xanthorrhoea brunonis*	-	Blackboy	Local
	Xanthorrhoea gracilis	-		Local
	Xanthorrhoea preissii	-	Blackboy	Local
Zamiaceae	*Macrozamia riedlei*	-	Zamia Palm	Local

APPENDIX 10

REPTILES AND AMPHIBIANS SURVEY 1998

FAMILY	SPECIES	COMMON NAME
SCINCIDAE (Skinks)	*Ctenotus lesuerii***	Western limestone ctenotus
	*Menetia greyii***	Common dwarf skink
	*Hemiergis quadrilieata***	Two-toed earless skink
	Cryptoblepharus plagiocephalus^	Snake eyed, fence or sun skink
	Lerista lineata^	Perth lined lerista
	Tiliqua rugosa	Bobtail skink
AGAMIDAE (Dragon lizards)	*Pogona minor*^	Western Bearded Dragon
VARANIDAE (Goannas or monitor lizards)	*Varanus gouldii*^	Gould's monitor
ELAPIDAE (Front fanged venomous land snakes)	*Pseudonaja affinis*^	Dugite or spotted brown snake
MYOBATRACHIDAE (Ground frogs)	*Myobatrachus gouldii***	Turtle frog

* Identified May 1998
^ Identified November 1998
** Identified in both surveys

Appendix 11

SUMMARY OF SUBMISSIONS ON DRAFT MANAGEMENT PLAN

Submission Number	Name of Respondent	Summary of Submission	Comments and Response
1	Margaret Matthews Submitted by email	* The Wireless Hill station was constructed by a German firm called Telefuken and Co. Suggested amendments: It was constructed by the Australian Wireless Company and engineers from the German firm Telefunken and Co. oversaw the installation of the equipment.	Text changed to concur with this submission.
		* *Erharta calcina* Suggested amendments: - *Ehrharta calycina* is the correct spelling of the scientific name.	The spelling was amended.
		* Suggests that the Wireless Hill MP includes a recommendation that an area of bushland adjacent to the Civic Centre be formally added to the reserve.	Suggestion noted. The Executive Management Team was consulted regarding the rezoning suggestion. Advice was received that the bushland is adequately protected under the current zoning as crown land with a recreational and open space zoning. Any alterations to the land must first be approved by the State government. The suggested recommendation has been noted but has been rejected for the above reasons.