

## JORGENSEN PARK MANAGEMENT PLAN 2007



Prepared for the  
Shire of Kalamunda by the  
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## Executive Summary

Jorgensen Park is a recreational park within the Shire of Kalamunda, bounded by private property and National Park. The park is highly valued and used by the local community and has the potential to attract a wide variety of recreational users.

### Values

The park has conservation and recreational values. Whilst an area of the park has been cleared due to its previous land use as a golf course there are areas of high quality bushland which are significant for maintaining biodiversity within the park.

The park is a popular recreational area due to the bushland setting and the dog exercise area where the dogs are allowed off their leads. There are also opportunities to facilitate and increase park utilisation by improving the existing facilities and promoting their usage.

### Key Issues and Threats

The main issues in relation to the management of Jorgensen Park fall under environmental and recreation considerations and include the following:

#### Environmental Issues

- Land Tenure and Management Zoning;
- Weed and pest control;
- Dieback disease;
- Erosion control;
- Fire management; and
- Access control.

#### Recreation Issues

- Facility management;
- Signage;
- Support infrastructure; and
- Access issues.

### Management Recommendations

The broad management objectives for Jorgensen Park are:

1. The protection and enhancement of the biodiversity within Jorgensen Park
2. The improvement of the recreational aspects of Jorgensen Park.

These broad management objectives can be achieved through specific implementation of the following management strategies and recommendations:

Land tenure and management zoning
1. Prevent potential conflicts arising over conservation and recreational uses by designating conservation and recreation management zones within the park through the following means:

1a) Request that the WAPC transfer management of the conservation areas listed in Figure 18 to the Department of Environment and Conservation (DEC), subject to the DEC's acceptance of the transfer, to be included into the adjoining national park.
1b) Seek a management order for the Shire for the recreational areas of Jorgensen Park to continue providing the facilities valued by the park users.
1c) Undertake the development of the management guidelines for the park in consultation with the Kalamunda community.
<b>Weed and Pest Control</b>
2. Implement weed and pest management measures by the following means:
2a) Manage the boundary between the conservation areas and grassed areas by implementing appropriate weed control measures.
2b) Undertake a staged weed control along the creekline in the western part of Jorgensen Park in conjunction with erosion control and rehabilitation works.
2c) Undertake a comprehensive weed control programme to reduce the occurrence of grassy weed species such as paspalum, especially where grasses are invading bushland.
2d) Gradually remove eastern states wattles and tagasaste bushes and replace with local native trees.
2e) Undertake follow up weed control especially near conservation zoned areas.
<b>Dieback Disease</b>
3. Inform the park users about the spread of dieback disease within Jorgensen Park, the surrounding Kalamunda National Park and private properties by the following means:
3a) Use signage to educate the users of the park of the risk that their activities may spread dieback disease around the reserve and onto their own properties.
3b) Advise users groups through bookings procedures of the risk that their activities may spread dieback disease around the reserve and onto their own properties, and include materials on how to avoid or minimise that risk.
<b>Erosion Control</b>
4. Undertake erosion control by stream and firebreak management by the following means:
4a) Rehabilitate the creekline by stabilising and revegetating the banks in conjunction with weed control activities.
4b) Undertake minor drainage control on steep firebreaks to prevent erosion.
4c) Improve access to the park from the parking area to reduce the safety hazard.
<b>Fire Management</b>
5. Undertake fire management by developing and implementing a prevention, response and rehabilitation plan incorporating the following strategies:
5a) Continue fire risk reduction measures at current frequencies – mowing fairways and maintaining fire break condition.
5b) Undertake mosaic control burning at frequencies which do not degrade the condition of the vegetation.
5c) Give priority to weed control following fires, either wild or controlled, to reduce the impact of introduced species on biodiversity and fire risk.
<b>Access Control</b>
6. Implement access control measures including:
6a) Fence the playground barbecue area to provide a family focussed area free from

unrestrained dogs.
6b) Provide seating at suitable points in the park.
6c) Investigate suitable locations for the provision of a water fountain, with separate outlets for human use and for dog use within the park
<b>RECREATION MANAGEMENT</b>
<b>Facility Management</b>
7. Develop and implement management and communication strategies that retain the attractions of Jorgensen Park and address the issues identified in the survey by the following means:
7a) Promote the attractions of Jorgensen Park and increase usage of the facilities in order to manage the park effectively.
7b) Promote Jorgensen Park as a destination park with specific characteristics to attract users.
7c) Promote park events to the general Shire of Kalamunda community.
7d) Develop a set of guidelines for acceptable activities within the park and for the staging of events procedure.
7e) develop and implement a booking system for key facilities/uses.
7f) Encourage a wider range of compatible users to be part of the Jorgensen Park community including sport and recreation users, educational groups and flora and fauna groups.
7g) Manage events conducted in the park as part of a larger calendar of events to promote awareness of events by the general community.
7h) Consider setting aside specific areas or trails to separate different users with specific and non-compatible needs such as horse-riders, cyclists and dog walkers.
<b>Signage</b>
8. Improve information and management signage at entry points and within the park by the following means:
8a) Enhance the information signage throughout the park to include management information, including dieback risk, at the entry points; and directional and point of interest signage within the facility.
8b) Encourage users to protect fauna and flora by keeping unrestrained dogs within the recreation zone.
<b>Support Infrastructure</b>
9. Upgrade the support infrastructure in Jorgensen Park including:
9a) Upgrade the support infrastructure in Jorgensen Park, specifically the toilets, picnic table/s and playground equipment.
9b) Prepare a disabilities access implementation plan (DAIP) to upgrade the park access to enable people with disabilities to have access to the park.
9c) Provide seating at suitable points in the park.

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# 1 Introduction

Jorgensen Park is a large recreation park in the Shire of Kalamunda. It has cleared areas stemming from its previous use as a golf course and these areas are used by local residents. Some of the fairways are revegetating naturally due to the close proximity of high conservation bushland both within the reserve and in the neighbouring national park. Other fairways have been used for commemorative plantings. All the fairways are mowed regularly to reduce fire fuel hazards.

## 1.1 Background

The drive for the preparation of a Management Plan for Jorgensen Park was initiated by community requests regarding the upgrading of facilities. The project scope was then expanded to consider management of the natural resources within the site and the need to determine suitable and compatible recreational and cultural activities within the reserve and the facilities required.

Requests from the community have all related to the upgrade of existing facilities rather than the development of new infrastructure.

Council has received a number of suggestions to specifically develop the area as a botanical garden, amongst others and it is felt appropriate to develop a Strategic Development Plan to ensure that the community long range needs are determined so that appropriate consideration can be given to planning for the future.

### 1.1.1 Purpose of Report

The purpose of this management plan is to provide a structured management approach for Jorgensen Park to protect the natural values of the reserve, whilst recognising the importance of the area for active and passive recreation. This is achieved through the formulation of strategies and actions with responsibilities and time frames for implementation.

### 1.1.2 Methodology

The Jorgensen Park management plan was developed in collaboration with the Shire of Kalamunda, the EMRC (Eastern Metropolitan Regional Council) and Paper Plane Consulting.

Community consultation was undertaken by a survey of the current users of the park facilities to help determine the preferred passive, recreational and development uses of the park. The survey was sent to associations, sporting clubs that currently used the park facilities and by inviting community members to fill out the form on-line on the Shire's web-site, in person at the Shire of Kalamunda offices or at the shire libraries.

Maps of vegetation communities, vegetation condition and weed distribution were created using the Shire of Kalamunda Geographic Information System (GIS). The vegetation community, vegetation condition and weed mapping of Jorgensen Park was undertaken during autumn 2007.

## 1.2 Location of Reserve

Jorgensen Park lies in the Darling Range just east of the Darling Scarp. It is located 2km east of the Kalamunda townsite approximately 20km east of the Perth metropolitan area.

The total area of the Park is 61.874 hectares. It is bounded by Spring Road in the west, Kalamunda National Park to the north and east, and Crescent Road forming part of the southern boundary. Access to the Park is via the paved carpark off Mundaring Weir Road. This carpark provides parking for 100 cars for those using the Park and to access the buildings used by the Kalamunda Community Learning Centre. There is a block of public toilets on the north-western edge of the carpark.

**Figure 1 Location of Jorgensen Park**

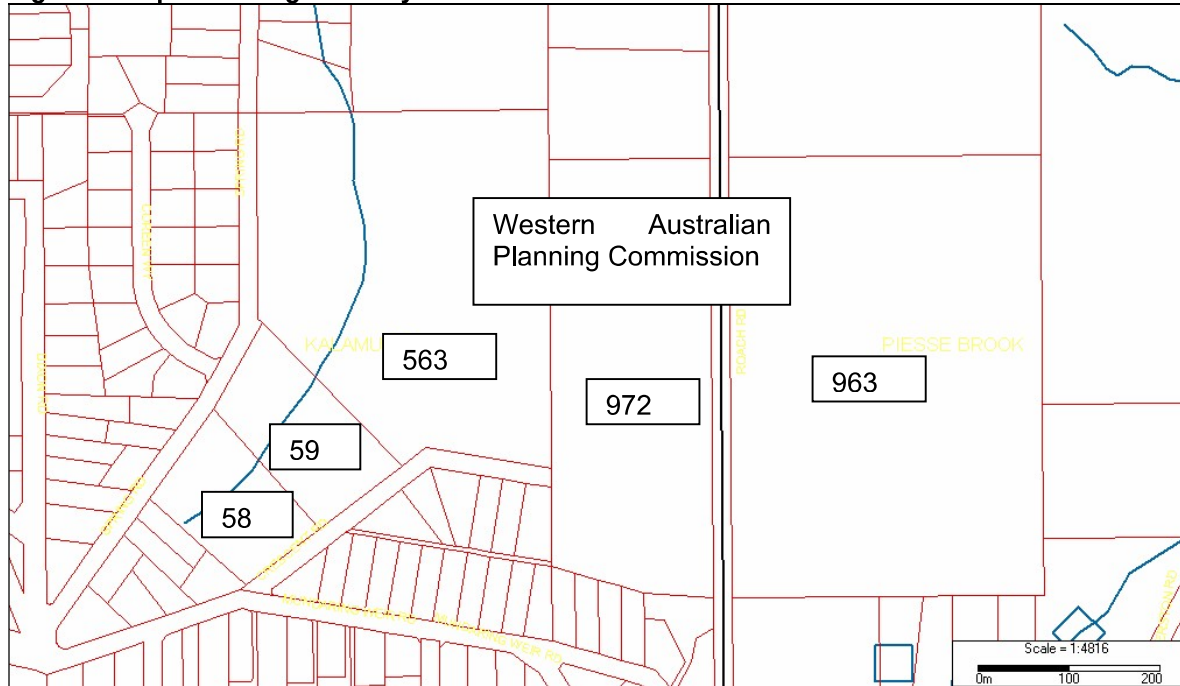


Source: Whereis.com 2007

## 1.3 Vesting and Purpose

The parklands are held by the Western Australian Planning Commission (previously the Metropolitan Regional Planning Authority) and the total area of the parcels is 61.874 Ha. It is zoned for Regional Parks and Recreation and is leased by the Shire of Kalamunda (from the Western Australian Planning Commission). Jorgensen Park is also located within the public drinking water source area of the Middle Helena Catchment (2003).

**Figure 2: Map of Vesting authority and Lot Numbers**



## 1.4 Catchment and Land-use Conditions

Jorgensen Park is in the Helena River sub-catchment of the Swan-Canning River system.

The key management issues identified for the sub-catchment are:

- Maintain and, if possible, improve water quality in the catchment
- Improve the management of remnant vegetation, and plan and target revegetation in the catchment to benefit biodiversity and habitat and to improve water quality
- Protect our resources and environment through improved land management
- Increase awareness of catchment management in order to maintain and improve environmental qualities
- Protect the catchment and waterways through management and practices that balance Aboriginal and other heritage issues, recreation uses and accessibility with environmental needs.
- Aim for long-term sustainability of the natural ecosystem by improving the management of the Helena River.

Runoff from the reserves flows in a northerly direction into Piesse Brook and the Swan River. Management of these reserves will therefore require consideration to maintain appropriate water quality standards.

## 1.5 History

Jorgensen Park is listed as an Aboriginal Site on the Heritage Site Register.

Object Id: 952  
Site Id: 3758/SO2148  
Name: Helena River  
Site Type: C, M, RP (ceremonial, mythological, repository/cache)  
(Department of Indigenous Affairs, 2007)

Most of the land covered by this park was pioneered by Jacob Schmitt from Dusseldorf in Germany (Heritage Council of Western Australia, 1998). He moved to the site in 1895 and developed an orchard with his wife Annie, and became an active member of the Darling Range Vine and Fruit Grower's Association and the local Roads board. In 1928 Schmitt sold 65 acres to the newly-formed golf club. One of the members who funded the purchase was Harry Jorgensen. The Park was named after his son, Hedley Jorgensen in recognition of his long association with the golf club and with many other sporting and public organisations.

The old clubhouse was the home of the Kalamunda Learning Centre from 1977-1994.

## 1.6 Community Involvement

The park is used by a number of sporting clubs, and associations see **Appendix 1**. The facilities include:

- Jorgensen Park Pavilion
- Cottage
- Public toilets
- Barbecue
- Playground equipment
- Car Parking
- Walking tracks
- Dog exercise area

## 1.7 Bibbulmun Track

Jorgensen Park is the first parkland crossed by the Bibbulmun Track. The Bibbulmun Track is a 650 kilometre long distance walk trail from Kalamunda to Walpole on the south coast. The name "Bibbulmun" refers to the Aboriginal language group of the tribes who inhabited some of the area traversed by the trail (Heritage Council of Western Australia, 1998).

**Figure 3: The Bibbulmun Track**



## 1.8 Current Management Practices

The work practices and expenditure listed below have been taken from the 2006/2007 budget. The total budget for bushland reserves maintenance in 2006/2007 was \$8900.

**Table 1: Parks and Recreation Expenditure for Jorgensen Park**

Item	Budget	Actual
Tractor Mowing		819
Hand Mowing		792
Tree Pruning		542
Tree Planting		222
Garden beds		127
Litter clean up		56
Reticulation system		0
Weed and pest control	0	0
<b>Total</b>	<b>\$8900</b>	<b>\$2559</b>

Data from Shire of Kalamunda works budget.

## 1.9 Future Infrastructure Needs

The survey results (**Appendix 2**) indicated that the facilities available at Jorgensen Park are adequate for the current range of activities undertaken, however, some improvements and/or upgrading of the existing facilities is necessary (see **section 3.3.5**). Park users also indicated a preference for no infrastructure development except in the areas of the walking and hiking trails and the barbecue and playground area (see **section 3.3.6**). These issues are discussed further in the recreation section (see **section 4.3**).

Management actions will depend on maintenance of the lease from the Western Australian Planning Commission. Investment in new infrastructure in Jorgensen Park would be more appropriate if a management order was held by the Shire of Kalamunda. This would then enable the Shire of Kalamunda to market Jorgensen Park as a destination area, attracting specific activity groups and the public for events.

A letter from the Western Australian Planning Commission seeking direction from the Shire of Kalamunda on management orders for Jorgensen Park was received in July 2007. (Appendix 3)

Future infrastructure needs will be affected by the number and types of park users and by how well the infrastructure is maintained. Implementation of the management plan should address these issues and include a periodical review of infrastructure needs.

## 2 DESCRIPTION OF THE ENVIRONMENT

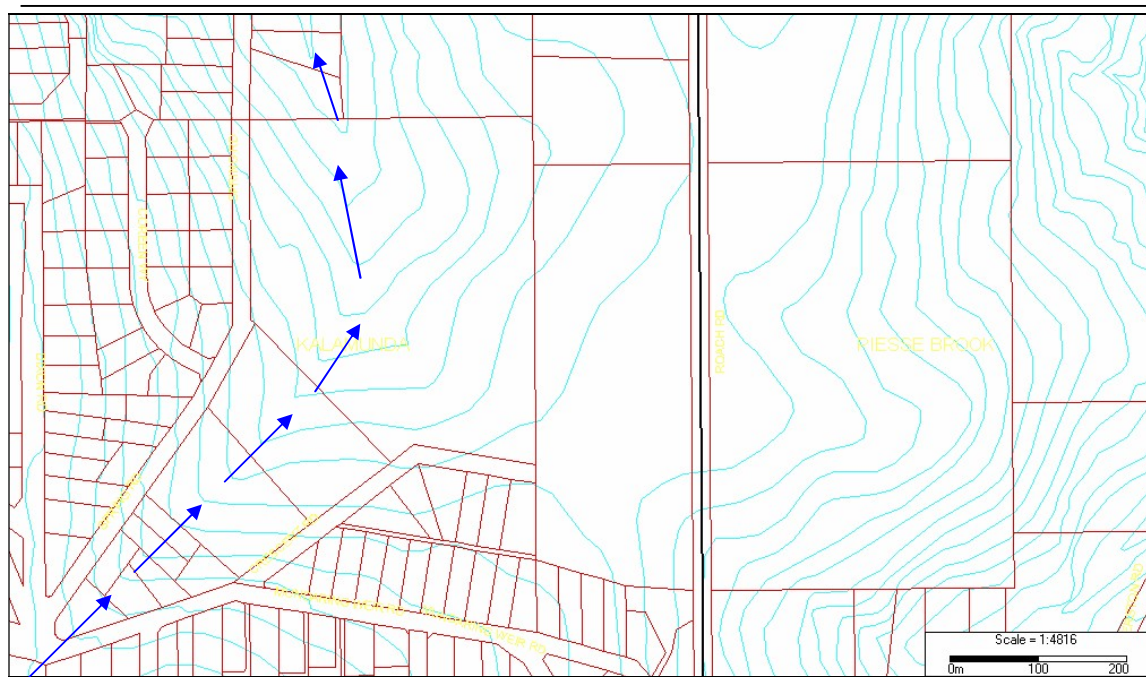
### 2.1 Topography and Climate

The Darling Scarp climate is Mediterranean with hot dry summers and cool wet winters. The topography of the hills influences the local climate so that the climate pattern in Jorgensen Park is slightly different to that on the Swan Coastal Plain. The elevation of the hills (252 metres above sea level at Jorgensen Park) causes more cold moist air from the plain to rise leading to more precipitation in the hills compared to the Swan Coastal Plain.

Jorgensen Park contours drop steeply to the east and gently to the west from a centrally located ridgeline. The highest point is 255 metres above sea level and the lowest point is 173 metres above sea level (Wilkinson, 1990).

A creekline runs to the north through the western part of the reserve into Spring Gully which in turn flows into Piesse Brook and into the Helena River (see **Figure 4**). Water from this part of the Helena River is used for drinking water and therefore water quality issues must be taken into account when managing the park.

**Figure 4: Landforms and Creekline in Jorgensen Park**



### 2.2 Landform and Soils

The soils are classed as Yarragil 1 in the Darling Range Land Capability Study (King and Wells, 1990). The Yarragil unit occurs on the minor upland valleys in the western part of the Darling Plateau and encompasses the valley sideslopes, headwaters and floor. The soils range from yellow duplex soils to sands over mottled clay on sideslopes and headwaters to poorly drained

uniform clays on valley floors. The Yarragil unit is commonly adjacent to the Dwellingup unit associated with major valleys.

Jorgensen Park has minimal risk of acid sulphate soils. Yarragil soils are considered a class 3 Acid Sulphate Soil risk with low to nil risk of shallow Acid Sulphate Soils or Potential Acid Sulphate Soils within 3 metres of the surface.

The underlying geology consists of ancient Archaean granite, which has weathered into a lateritic cap rock and leached clays. Granite bedrock is evident in the eastern side of Jorgensen Park where erosion has exposed fresh outcrops.

## 2.3 Vegetation and Flora

The vegetation in Jorgensen Park is part of the northern Jarrah Forests.

A brief vegetation survey of Jorgensen Park was carried out in 1990 (Mattiske and Woodman, cited in Wilkinson, 1990). This survey recorded 27 families and 87 native species (**Appendix 1**). The authors consider that a more comprehensive survey would record 300-400 species (cited in Wilkinson, 1990, p12). Twelve plant communities were identified in this survey based on the Havel (1975a and b) system (cited in Wilkinson, 1990, p12). Maps were not provided with this data to illustrate the distribution of these plant communities.

Broad vegetation complex units are based on the underlying soil types, as soil has a major influence on vegetation. The soil type in Jorgensen Park is listed as Yarragil Complex (Minimum Development of Swamps) in medium to high rainfall (McCarthy and Loos, 1996). The vegetation is described as a mixture of open forest of jarrah-marri with some yarri (*Eucalyptus patens*) and bullich (*Eucalyptus megacarpa*). The dominant site species are: *Acacia alata*, *Agonis linearifolia*, *Astartea fascicularis*, *Lepidospermum angustatum*, *Mesomelaena tetragona*, *Dampiera alata*, *Hypocalymma angustifolium*, *Leptospermum ellipticum* and *Synphea petiolaris*.

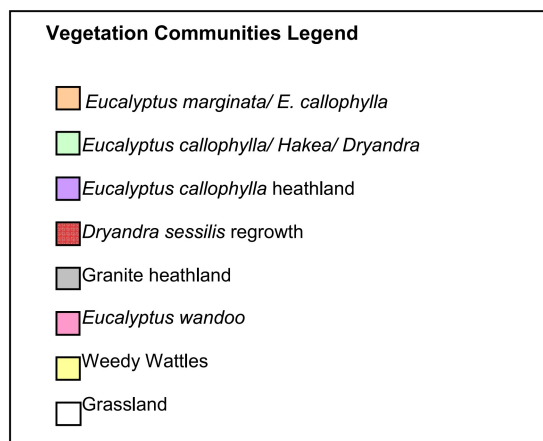
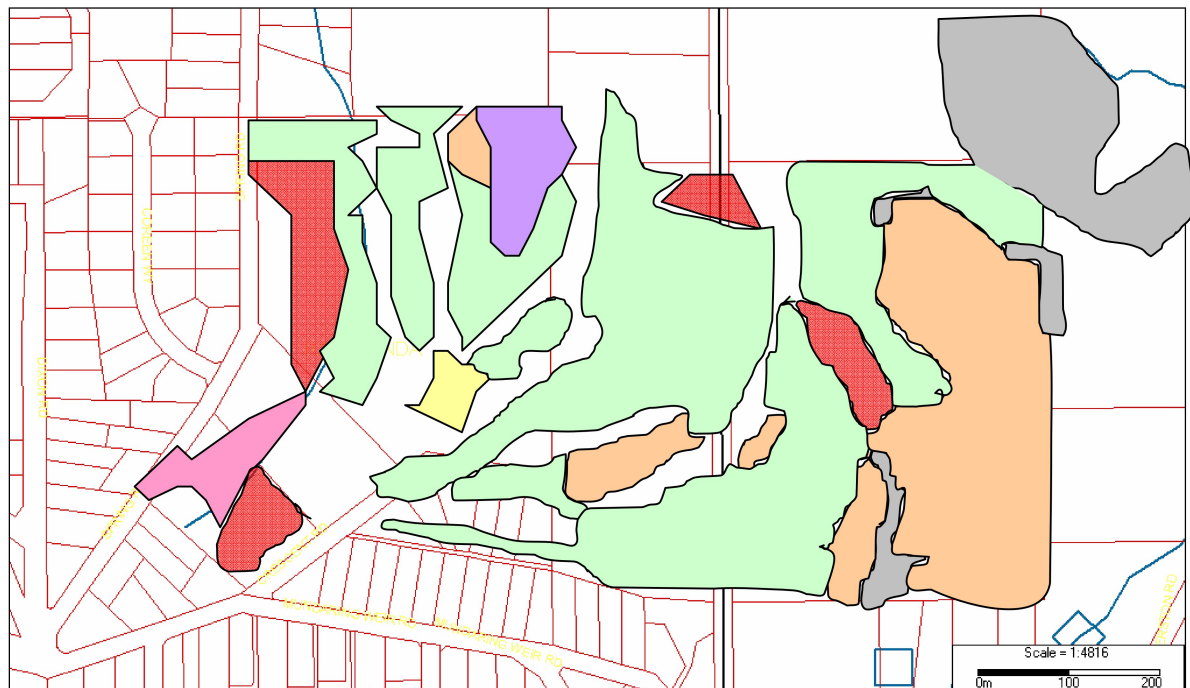
### 2.3.1 Vegetation Communities

Jorgensen Park was mapped in May 2007 using vegetation units based on the most common overstorey species. Simple categories are used to determine management priorities and threats. These communities are:

- *Eucalyptus marginata*/*Corymbia callophylla* open woodland on slopes with outcropping granite. Understorey species include; *Xanthorrhoea preissii*, *Hibbertia hypericoides*, *Lechenaultia biloba*, *Dryandra lindleyana*. This coincides with vegetation community types 2 and 3 mapped by Mattiske and Woodman (cited in Wilkinson, 1990).
- *Corymbia callophylla* open woodland with *Hakea*/*Dryandra* shrubland on upper slopes, seasonally damp. This consists of dense *Hakea trifurcata* and *Dryandra sessilis* with an open overstorey of marri. This corresponds to community type 10 in Mattiske and Woodman (cited in Wilkinson, 1990).
- *Corymbia callophylla* open heathland on upper slopes. Understorey species include; *Mesomelaena tetragona*, *Lepidosperma angustatum*, *Lechenaultia biloba*, *Baekkea camphorosmae*, *Dampiera alata* and *Hypocalymma angustifolium*. This corresponds to type 4 of Mattiske and Woodman (cited in Wilkinson, 1990).
- *Dryandra sessilis* regrowth. Similar to the open marri woodland with *Hakea*/*Dryandra* understorey except this community is completely dominated by *Dryandra sessilis*.

- Granite heathland on granite outcrops with very shallow soils. Dominant understorey species include; *Borya sphaerocephala*, *Grevillea bipinnatifida*, *Hakea undulata* and various species of *Stylidium*. Corresponds to community 7 in Matiske and Woodman (cited in Wilkinson, 1990).
- *E. wandoo* open woodland. In Jorgensen Park, these areas are very degraded with an open woodland of wandoo and/or marri with an understorey of grassland. This corresponds to community 6 in Matiske and Woodman (1990).
- Weedy wattle woodland. Dense to open woodland of mixed *Acacia* species dominated by introduced species. Corresponds to type 10 in Matiske and Woodman (1990).
- Open grassland. These areas comprise the old fairways of the golf course and form long open walks through the park. These areas correspond to type 12 in Matiske and Woodman (1990).

**Figure 5: Mapped Vegetation Communities**

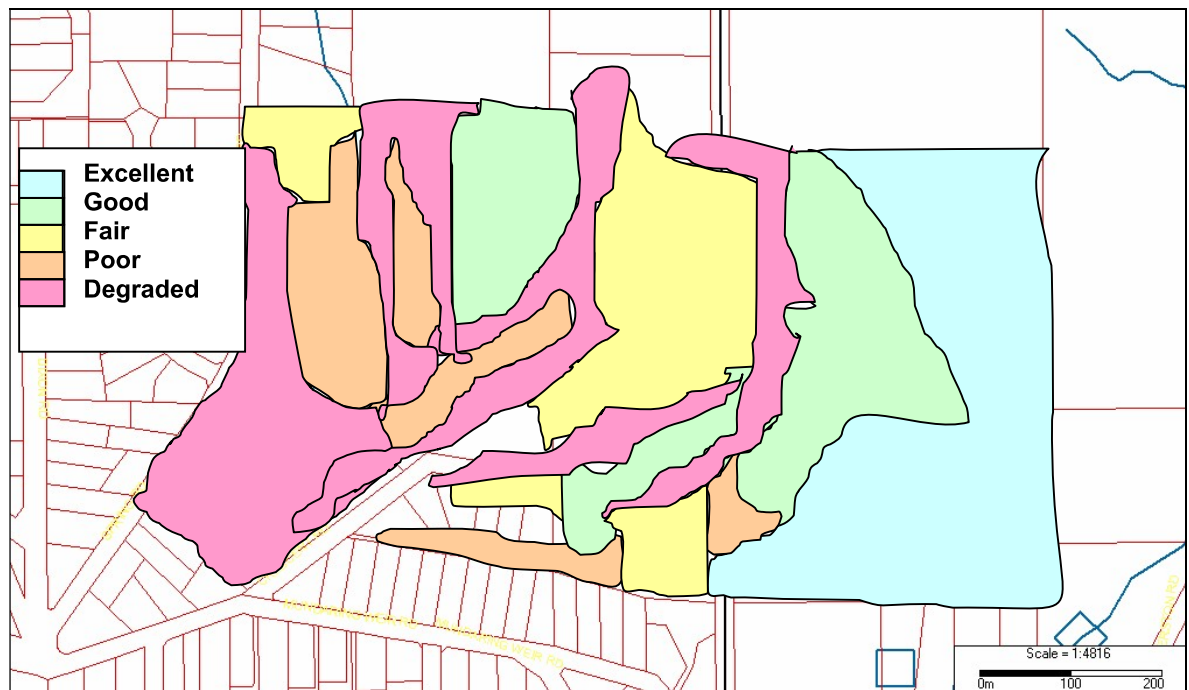


### 2.3.2 Vegetation Condition

The vegetation condition scales used relate closely to those used by Keighery (1994), leaving out the 'Pristine' category as none of Jorgensen Park is in this category. These categories are:

- Excellent: vegetation structure intact, disturbance minimal, weeds rare
- Good: vegetation altered, signs of disturbance, but mainly restricted to tracks, non-invasive weeds present, excellent chances of regeneration with minor weed control required
- Fair: vegetation altered with signs of weed invasion comprising less than 50% of the species present, may be regenerated with extensive weed control
- Poor: Vegetation highly altered by extensive disturbance, weeds common, may be subject to dieback or grazing, may be regenerated if seed store remaining
- Degraded: No vegetation structure remaining with sparse overstorey trees or shrubs. Dominated by introduced annual grasses subject to high fire risk.

Figure 6: Vegetation Condition at Jorgensen Park



### 2.3.3 Flora Survey and Declared Rare and Priority Flora

No Threatened Ecological Communities (TEC's) or Declared Rare or Priority Flora (DRF) were listed for Jorgensen Park according to the Shire of Kalamunda Geographic Information System (GIS).

## 2.4 Fauna

The fauna survey of Jorgensen Park was limited to a desktop survey. Generally, management actions focussed on conservation will also assist with the protection of fauna habitat and species protection.

### Mammals

The Northern Jarrah forest supports about 30 native mammal species. Species common to this area include:

**Table 2: Common fauna in Jorgensen Park**

**Table 2a: Common mammal species in Jorgensen Park**

Common Name	Botanical Name
Grey Kangaroo	<i>Macropus fuliginosus</i>
Western Brush Wallaby	<i>Macropus irma</i>
Western Pygmy Possum	<i>Cercartetus concinnus</i>
Southern Brown Bandicoot	<i>Isodon obesulus</i>

Tracks and scats indicate that there is constant movement of animals between Jorgensen Park and the nearby National Park. At this stage, no populations of rare fauna have been identified.

### Birds

Birds noted in the reserve include:

**Table 2b: Common bird species in Jorgensen Park**

Common Name	Species Name
Bronzewing pigeon	<i>Phaps chalcoptera</i>
Twenty Eight Parrot	<i>Barnardius zonarius</i>
Splendid fairy wren	<i>Malurus splendens</i>
Scarlet Robin	<i>Petroica multicolor</i>
Magpie	<i>Gymnorhina tibicen</i>
Baudins Black Cockatoo	<i>Calyptorhynchus baudinii</i>

The table above lists birds noted during site visits, but a separate bird survey was not undertaken. The Bronzewing pigeon (schedule 3) and the Black cockatoo (schedule 1, 4) are listed as significant bird species in the South West of Western Australia.



**Figure 7: Kangaroo Scats at Jorgensen Park**

## Feral animals

Feral animals are common in the Northern Jarrah forest. The park is also one of the few areas in the Shire of Kalamunda where dogs can be exercised off the leash.

**Table 2c: Common feral species in Northern Jarrah Forest**

Common Name	Scientific Name
Cat	<i>Felis catus</i>
Dog	<i>Canis familiaris</i>
Fox	<i>Vulpes vulpes</i>
Pig	<i>Sus scrofa</i>
Rat	<i>Rattus rattus</i>
Mouse	<i>Mus musculus</i>
Rabbit	<i>Oryctolagus cuniculus</i>
European bees	<i>Apis mellifera</i>

## 2.5 Dieback Disease (*Phytophthora cinnamomi*)

Dieback mapping was undertaken in Jorgensen Park in 2003 by Glevan Consulting (**Appendix 4**). The disease is present in the majority of Jorgensen Park. This is likely to be a result of:

- Brought in by earthmoving equipment during the original clearing of the vegetation for the golf course in the 1950's before knowledge of how dieback was spread; and
- The watering of the fairways would be a source of moisture in summer setting up ideal conditions for the spread of dieback. Winter rainfall would also assist in spreading the disease.

The disease is still progressing through higher parts of the landscape where deaths of vegetation due to dieback were noted. Of nine samples taken in the reserve only two returned a negative result and these were in areas that manifested other signs of the disease. The uninfested areas were interspersed amongst infected areas making protection of dieback free areas very difficult. Management actions are needed to prevent or reduce the spread of dieback from Jorgensen Park to other areas.

## 2.6 Fire Management, Prevention, Response and Rehabilitation Plan

The Shire of Kalamunda is required to take actions to prevent bush fires under Part III of the *Bush Fires Act 1954 (WA)*. Fire management of bushland reserves is a key function undertaken by the Rangers and Corporate Services at the Shire of Kalamunda (Shire of Kalamunda, 1996). The shire employs two Fire Control Officers to implement the Shire's Fire Management Plan, inspect reserves and firebreaks and patrol high fire risk areas. **Table 3** below outlines the areas of responsibility for fire management.

**Table 3: Responsibilities for Fire Management in Jorgensen Park**

Who	Responsibilities
Land owner/manager	Overall fire management planning Implementation of prevention, preparedness and recovery strategies
Local Government	Compliance with Bush Fires Act 1954, including firebreak inspections and exemptions. Overall fire management planning and implementation of prevention, preparedness and recovery strategies for vested lands. Support of Volunteer Bush Fire Brigades (in areas outside the gazetted fire district)
Fire and Rescue Service or Volunteer Bush Fire Brigade	Planning and implementation of response strategies. Response activities Provision of advice on all aspects of fire management planning, including prevention, preparedness, response and recovery.
Friends Group	Contribute to fire management planning May include overall management of the reserve or responsibility for certain tasks.

Source: Fire and Emergency Services Authority of WA (FESA) and Urban Bushland Council WA Inc., 2000.

The areas in Jorgensen Park of particular concern for fire risk reduction are the boundaries with private property to the south east and north west (see **figure 8**) where human safety and property damage are at risk. Control burns targeting the upland jarrah forest areas in the south eastern corner have been carried out on a regular basis.

**Figure 8: Evidence of fire in the north western part of Jorgensen Park**



The other area of concern is the boundary of Jorgensen Park to the east and north adjacent to the state government managed national park. Access for fire appliances is considered to be good due to the presence of the wide cleared fairways.

Other methods of fire risk reduction in Jorgensen Park include:

- Regular maintenance of existing fire breaks along the higher ground to the north and east of the reserve;
- Regular mowing of the fairways in late winter to prevent grasses from setting seed and invading bushland areas;

- Removal of woody weeds such as tagasaste and silver wattles which further degrade the condition of the bush; and
- Controlled burning of selected areas.

Decisions concerning fire management in Jorgensen Park use the following key objectives.

1. Protection of human life
2. Protection of property
3. Protection of bushlands biological and ecological values.

Decisions about the timing of controlled burns are based on inspections by the Fire Protection Crew and the CALM burn regime (Shire of Kalamunda, 1996).

The controlled burn regime developed by the Department of Environment and Conservation (DEC) formerly CALM and used by the Shire of Kalamunda involves three steps:

1. Two spring burns within the first 6-8 years followed by
2. One autumn burn in the next 6-8 year period and then
3. No burning in the next 10-14 years.

The fire management plan will be based on principles established in the “Fire Management Planning for Urban Bushland” prepared by FESA and the Urban Bushland Council.

## 2.7 Hydrology and Erosion

A creekline runs to the north through the western part of the reserve into Spring Gully which in turn flows into Piesse Brook and into the Helena River. Water from the Helena River is used for drinking water via the Helena Pipe-head Dam and therefore water quality issues must be taken into account when managing the park.

The creekline is deeply incised and eroded due to loss of creekline vegetation and runoff from cleared slopes. Other eroded areas include the area around the picnic table and the entry to the park from the carpark to the closest fairway. These deep furrows increase the funnelling of runoff water and will deepen over time (see **Figure 9**).

In the eastern part of Jorgensen Park some of the firebreaks have been constructed across steep contours. These tracks are deeply furrowed and may become impassable.

**Figure 9: Minor creekline erosion**



## 2.8 Weed Invasion

The vegetation surveys undertaken at Jorgensen Park have noted a number of problem weed species requiring management. These weeds include those within the reserve associated with past land use activities. Weeds are also being spread and introduced into the reserve from the original golf course, illegal vehicle access, horses, neighbouring residential properties and from rubbish dumping.

The old fairways themselves can be considered as weedy areas and these require a high degree of management to control the potential fire hazard and incursion of grasses into the higher quality bushland. Weed control in Jorgensen Park needs to be confined to the edges of the excellent and good quality bushland as delineated in **Figure 5 section 1.12.2**.

Weeds, according to Scheltema & Harris (1995), can be classified according to the extent of their distribution and their invasiveness as follows:

### Priority 1 - Major Weeds

These are the most serious and problematic weeds and often affect many reserves or habitats in ways likely to permanently degrade them.

### Priority 2 - Nuisance Weeds

These are serious weeds which are generally found in only a few locations and are usually found in highly disturbed areas.

### Priority 3 Minor Weeds

These are weeds having little known effect. They are not as serious and occur in smaller numbers or are less competitive than priority two weeds.

The Shire of Kalamunda has adopted a Weed Management Plan in 2002, which identified the top ten priority weeds for the Shire and which informs the Shire's general weed management priorities in key bushland reserves.

The main weed species recorded at Jorgensen Park and their priority as identified both by Scheltema and Harris (1995) and the Shire's Weed Management Strategy, are listed below in **Table 4**. Weed control strategies need to initially target those major weed species which are threatening the integrity of the natural bushland.

**Table 4: Main Weed Species and their Priority in Jorgensen Park**

Weed Species	Priority	Comments	Location within Reserve	2002 Weed Strategy
Watsonia ( <i>Watsonia bulbifera</i> ) *( <i>Watsonia leipoldii</i> )	1	Highly invasive, especially in disturbed areas. Displaces native plant species.	Numerous in the drainage line at the western edge of the park and scattered in poor condition areas	Yes
Introduced Wattles ( <i>Acacia</i> sp)	1	Fast growing, out competes native plants. Produces prolific seed which is long lived.	Various species scattered throughout the reserve and in large clusters between fairways where it looks to have been planted intentionally.	
Tree Lucerne or Tagasaste	2	Establishes in disturbed areas. Can	Many individual plants scattered throughout the	

Weed Species	Priority	Comments	Location within Reserve	2002 Weed Strategy
*( <i>Chamaecytisus palmensis</i> )		form large thickets replacing native species. Produces large amounts of seeds which are long lived.	reserve.	
Paspalum *( <i>Paspalum dilatatum</i> )	1	Competes with and displaces native plant species and is a serious fire hazard.	Concentrated to drainage lines where it has replaced local evergreen species.	
Veldt Grass *( <i>Ehrharta calycina</i> )	1	Competes with and displaces native plant species and is a serious fire hazard.	Occurs throughout the reserve in many places similar to African Lovegrass.	
African Love Grass *( <i>Eragrostis curvula</i> )	1	Competes with and displaces native plant species and is a serious fire hazard.	Throughout disturbed areas, internal tracks, fire breaks and access roads.	Yes

## 3 RECREATIONAL ATTRIBUTES

### 3.1 Background

The landscape of Jorgensen Park, with open cleared fairways placed amongst bushland, lends itself to a wide range of recreation activities. These activities range from walking the dog and picnicking with the family to mountain bike riding and horse riding.

Urban parks have played a unique role in providing leisure opportunities to the community as a whole. Population growth, financial pressures and enhanced profile of parkland areas has meant that the sustainability of parks is becoming a challenging management task. Studies undertaken have indicated that people's attendance at parks is based upon the availability and quality of facilities.

The concept of 'destination parks' is one that has evolved from the United States where there appears to be greater emphasis on the management of parkland areas. Destination parks are facilities that provide people with a reason to visit. Because of their attractions, destination parks play a part in the world wide battle against poor physical health. In a community where large numbers of children (ages 6-11) and adolescence ages (12-19) are considered obese, the provision of an environment where people are encouraged to be active is seen as being advantageous.

In an article about destination parks Millar (2005) made three extremely important points. Firstly with regard to facilities, he suggested that the days of a simple playground and sand-pit are quickly fading. This thought merges with the second view point that parks can become gathering places for the whole family, multiple families from within the community and for tourists from outside the area. Economic benefit is Millar's final point; the potential to benefit, not only from tourism and an increase in business, but also from gains in property values as a result of the people wishing to relocate to an area (Millar 2005).

An example of telephone survey results in the Greater Wellington Regional Council examining residents' awareness, usage and satisfaction with regional parks and forests established that overall parks are used by a broad cross-section of the public, with a 49/51 male female split. However, park users are weighted more heavily toward;

- People over the age of 30 years of age, especially those in the 30 to 49 age group
- People from the mid to higher household income group, especially those with incomes over \$70,000 per annum.
- Most users (86%) tend to visit the park between 1-4 times per year. There is a core of people (14%) who visit the parks monthly or more often

These results are seen as being comparable to surveys commissioned by other park agencies. The survey continues on to consider what people felt were the most important park facilities, and what the most valued aspects of the park were. Toilets, walking tracks and signs/information were rated in the top three in terms of important facilities, while the most valued aspects of the park were;

- It's a relaxing/peaceful place to go
- The flora/native bush/native trees

- Easy access-close by suitable for all ages

In an article about the restoration of urban parks (New Life in Old Spaces) Terra Hargett (2001) discussed the dramatic change in the Riverside Park in New York. Part of the reason that residents were not using the park was because it did not have facilities that were desired by the community. The article went on to suggest that identifying the unused areas of the park and working to improve them would be a sound approach. Another suggestion in the article was that partnerships created with a view to improving the usage of the park would be a beneficial advance in improving public spaces.

In an article on the management of public open space Carmona and Magalhaes (2005) suggested that the management of public open space in the United Kingdom (UK) had, as its major challenge, insufficient financial resources. A large reason for there being a limited financial commitment to the management of parks and open space may be that in the UK, and possibly Australia, a majority of local authorities do not have dedicated and detailed strategies for the management of their open space. Very broad style corporate objectives or strategies for individual parts of the public open space agenda are more common.

A strategy which is increasingly popular in the UK is the involvement of partners in the management and financing of public open spaces. Coventry City Council has established an 'Inner City Management Company' to improve its image and therefore its public open spaces.

## 3.2 Community Consultation

### 3.2.1 Methodology

In developing the consultation phase of the project, the draft management proposal by Wilkinson (1990) provided the best starting point from which the project could be developed. The methodology and findings of the work done are sound and therefore useful to the proposed project. The consultation process undertaken in (1990) was relevant to the requirements of the project brief as presented. Consultation with the community following a line of questioning used in the initial research will either confirm or dispute the findings and therefore assist in the identification of changes to the expectations of the community with regard to Jorgensen Park.

Three questionnaires were developed in order to complete the consultation process (see **Appendix 2**).

### 3.2.2 Opinion survey

#### **Community survey**

Information was placed on the Shire web-site, advising of the opportunity to participate in the consultation process regarding Jorgensen Park and announcements placed in the Community Newspaper. The questionnaire was available online through the Shire of Kalamunda and the East Metropolitan Regional Council web sites, with hard copies of the document also being available at Shire of Kalamunda libraries. A timeframe of three weeks was allowed for the community to participate. This period was considered adequate to ensure that members of the community who wished to participate in the process had sufficient time to do so.

## User Survey

Jorgensen Park is a facility of regional significance and therefore there could be a wide range of individuals with an interest in the future management options of the facility. A user survey was conducted at the park to ensure that the viewpoints of users who were potentially non residents of the Shire of Kalamunda were also captured.

The User Survey was administered on a face to face basis at varying times and days of a specific week in order to get a reasonable cross section of users. The time allocated to the completion of the survey forms was 1.5 hours each day.

**Table 5: Survey Schedule**

Time of day	Implementation of the survey form by day and by time						
	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
AM			9.45am to 11.15 am		10.00 am to 11.30am	10.30 am to 12.00 pm	
PM		1.30pm to 3.00pm		2.30pm to 4.00pm		1.00pm to 2.30pm	1.00pm to 2.30pm

## Association/Club Survey

A specifically designed questionnaire was developed and forwarded to peak bodies that also may have an interest in the future management of Jorgensen Park. Input from groups or organisations that administer sports or activities that may be conducted in Jorgensen Park is critical to the development of recommendations for the park area. The Association/Club survey was sent by email with the researcher conducting phone interviews to ensure that a maximum response was achieved.

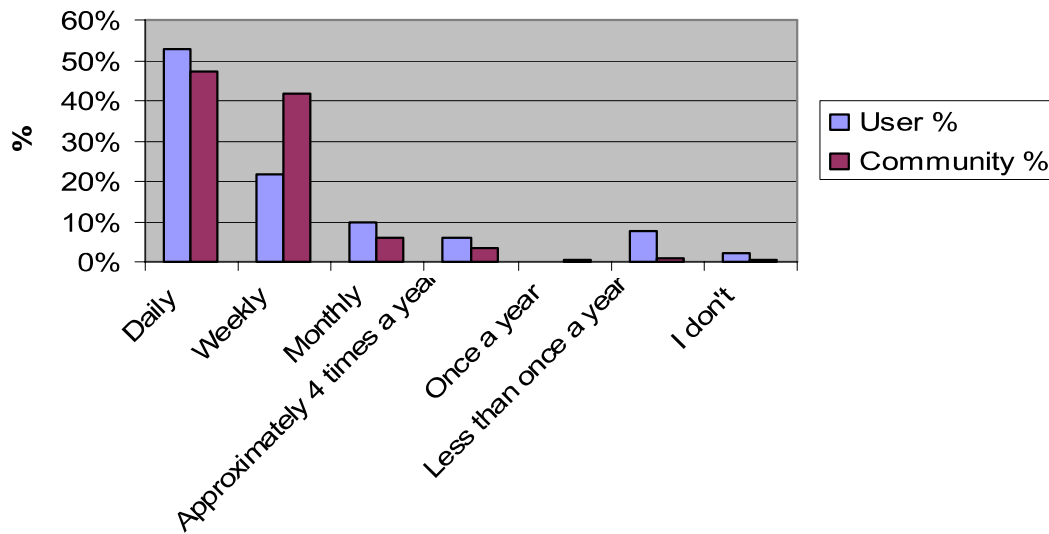
## 3.3 Survey Results

Sixty people were questioned as part of the user survey and 232 responses were received as part of the community survey. A total of 99.9% of respondents to the community survey had visited the park in the last three years; nearly 90% of respondents were regular users of the facility, visiting it on either a daily or weekly basis (see **Figure 10**). Whilst the weekends would be expected to be a popular time for park users, the actual numbers of people in the park were surprisingly consistent across the whole week.

### 3.3.1 Frequency of visits

The manner in which people attended the park was also evenly spread (see **Figure 11**). There is limited variation between attending on their own or with another person or family. Attendance as part of a group was the least likely for most visitors. From the community surveys it is apparent that most people vary how they attend the park, sometimes on their own while with others or family are also possible.

**Figure 10: Frequency of visits**

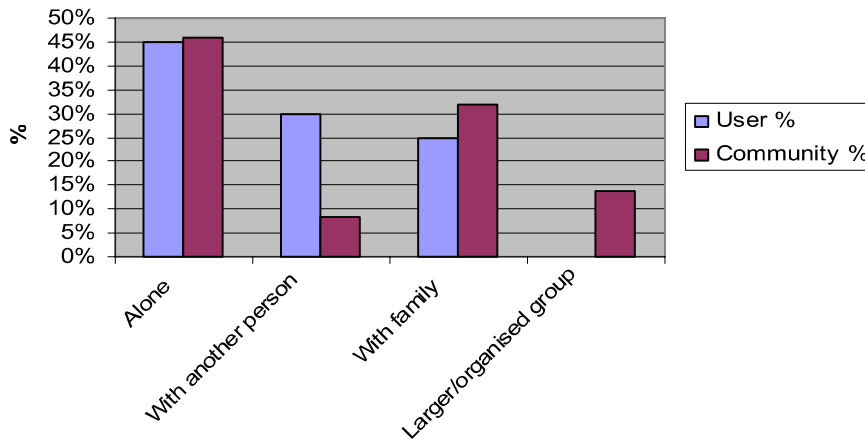


### 3.3.2 Attendance at Park

The surveys indicated that 50% of the survey respondents only visit Jorgensen Park. The other 50% visit a number of different parks. Feedback from the comments in the surveys would suggest that a large number of park users are attracted to Jorgensen Park for certain activities (walking their dogs off the lead being a prime attractor), while they utilise other facilities for other events, a common one being Stirk Park, which people often attend for children’s activities, community events and family concerts.

**Figure 11: Park attendance**

**Table Two**



### 3.3.3 Visits to Other Parks

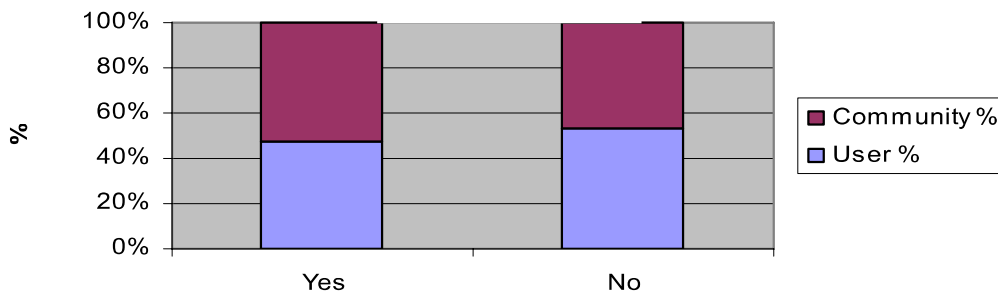
The other parks visited by users of Jorgensen Park and identified in the surveys include;

**Table 6: Other Parks visited by Survey Respondents**

<b>Park</b>	<b>Purpose</b>	<b>Comments</b>
Alan Anderson Reserve	Dog obedience classes Walking the dog Exercise Running for fitness	
Bayswater Gardens	Dog exercise Horse riding	Regular usage
Booralie Reserve	Exercising with dogs	Park where dogs are allowed off the leash
Boulevard Reserve	Exercising with dogs	Park where dogs are allowed off the leash
Darling Range Regional Park	Walking	Use various areas of the park area.
Darlington Oval	Walking the dog Family activities	
Fred Jacoby Park	Exercising dogs	
Garvey Reserve Redcliffe	Dog exercise	
Glen Forrest Train Park	Walking the dog Family activities	Family and children involved in these activities.
Gooseberry Hill National Park	Walking	
Hartfield Park	Exercise Dogs	
Inglewood Park	Dog exercise Horse riding	Regular usage
John Graham Reserve -Coogee	Family activity	Is a benchmark for family activities?
John Forrest National Park Leeuwin Naturalist National Park Namburg National Park Kalbarri National Park	Recreation Bush Walks Picnics Scenery Take visitors to see West Australian landscapes	
Kings Park	Variety of activities	Family activities Bush walking Guided tours
Koondoola Open Space	Dog exercise Horse riding	Regular usage
McCallum Park South Perth	Walking the dog Cycling	
Percy Seaton Park	Walking the dog Exercise	
Sandy Beach Reserve	Exercising dogs	
Stirk Park		Family activities Picnics

Park	Purpose	Comments
		Concerts Dog training Drawing
Whistle Pipe	Dog exercise	Weekly use
Whiteman Park	Family activities	Whiteman park offers a wide range of activity options for outings with an extended family
Wireless Hill Park	Wildflowers	Annual visit
Various State Parks	Bushwalking Rock climbing	Several times per year

**Figure 12: Visits to other parks**



The perceived attributes of Jorgensen Park that were clearly evident as is shown in **Table 7** below; respondents were decisive in their prioritisation of the attributes of Jorgensen Park.

### 3.3.4 Reasons for Visits

Being able to let dogs off the lead and appreciation of the area for its status as natural bushland are clearly the key attributes identified by the respondents of both the community and user survey. The availability of open space and the peace and quiet of the area are also considered significant.

The use of other parks by visitors to Jorgensen Park varies greatly, however there is a pattern of people visiting different parks as part of their dog exercising pastime. A high proportion of the parks other than Jorgensen are either located within or in close proximity to the Shire or Kalamunda. Park users have a variety of reasons for using various locations; the main use of Jorgensen Park is clearly exercising dogs.

There was very little response to either the user or community survey to indicate what other activities occurred within Jorgensen Park. Activities like horse riding or wildlife or flora observation were not indicated by respondents to the survey.

In most instances it was clear that people seemed to have specific reasons for attending different parks. Jorgensen Park is easily identifiable as a park that is extremely popular with people who wish to exercise their dogs (51% community survey and 38% user survey). There

is a strong correlation between the popularity of the park by dog walkers and the high number of park users who are local (have a residential postcode of 6076 which incorporates Jorgensen Park).

**Table 7: Reasons for Visiting Jorgensen Park**

Attributes of Jorgensen Park	User Survey			Community Survey		
	First Priority	Second Priority	Third Priority	First Priority	Second Priority	Third Priority
Natural Bush	38%	25%	3%	20%	9%	22%
Open Space	8%	15%	8%	4%	19%	13%
Wildflowers/Fauna/Flora	0%	5%	8%	2%	10%	11%
Dogs allowed off leash	38%	23%	11%	51%	8%	6%
Peaceful and quiet	10%	13%	14%	2%	10%	8%
Variety of walks and usage	0%	3%	19%	3%	8%	8%
Scenery/Views	3%	0%	3%	0%	3%	4%
Close to home	0%	8%	19%	3%	11%	9%
Undeveloped/Unorganised/Unstructured	0%	3%	5%	5%	12%	12%
Size	3%	3%	5%	0%	4%	3%
Attend/use the cottage or pavilion	3%	3%	0%	8%	4%	2%
Good car parking	0%	3%	5%	0%	3%	2%

### 3.3.5 Park Shortcomings

Clearly, respondents to both surveys have a genuine passion for Jorgensen Park as an area of bushland. The majority of responses to the question about the shortcomings of the park indicated that most people felt that the facility has no shortcomings. Criticism of the park were not significant, however, there was a general acknowledgement that the facility had some aspects that were identified as shortcomings in need of improvement. Issues identified by more than 5% of respondents as either a first or a second propriety consideration included:

- The overall condition of the support facilities such playground equipment, public toilets and barbecues. This was by far the most frequent shortcoming mentioned by all users;
- Lack of informational and directional signage;
- Motorbikes or cyclists using the park;
- Lack of carpark security;
- Dog and, for some users, horse excrement; and
- Access to the areas is not easy for some users.

An overall feeling gained from the tone of the responses was that whilst people acknowledged that there were some shortcomings to the park, they did not want to see changes to the area that may detract from their visit.

**Table 8: Jorgensen Park Shortcomings**

Shortcomings	User Survey			Community Survey		
	First Priority	Second Priority	Third Priority	First Priority	Second Priority	Third Priority
None	25.6%	71.4%	0.0%	41.5%	3.2%	0.0%
Horses	0.0%	0.0%	0.0%	1.8%	0.0%	2.2%
Weeds	0.0%	0.0%	0.0%	1.8%	12.7%	2.2%
Dog excrement	5.1%	0.0%	0.0%	7.4%	11.1%	0.0%
Horse excrement	2.6%	0.0%	0.0%	0.0%	9.5%	2.2%
Development in the park	0.0%	0.0%	0.0%	3.2%	4.8%	4.3%
Overcrowded by people	0.0%	0.0%	0.0%	0.0%	0.0%	2.2%
Poorly controlled dogs	2.6%	0.0%	0.0%	2.8%	9.5%	10.9%
Lack of a defined trails plan	0.0%	0.0%	0.0%	0.9%	7.9%	4.3%
Litter	0.0%	14.3%	0.0%	0.0%	3.2%	4.3%
Lack of car park security	7.7%	0.0%	16.7%	6.9%	9.5%	10.9%
Motorbikes/Cyclists in the park	2.6%	0.0%	0.0%	9.2%	11.1%	15.2%
Condition of support facilities	33.3%	7.1%	66.7%	12.9%	7.9%	13.0%
Barbecue facilities	2.6%	0.0%	0.0%	0.0%	0.0%	0.0%
Lack of picnic area	2.6%	7.1%	16.7%	0.5%	0.0%	0.0%
Lack of seating	5.1%	0.0%	0.0%	4.1%	1.6%	13.0%
Lack of information signage and directional signage	10.3%	0.0%	0.0%	6.9%	4.8%	8.7%
Lack of shade	0.0%	0.0%	0.0%	0.0%	3.2%	6.5%

**Figure 13: Outdated playground equipment**



**Figure 14: Poorly maintained playground**

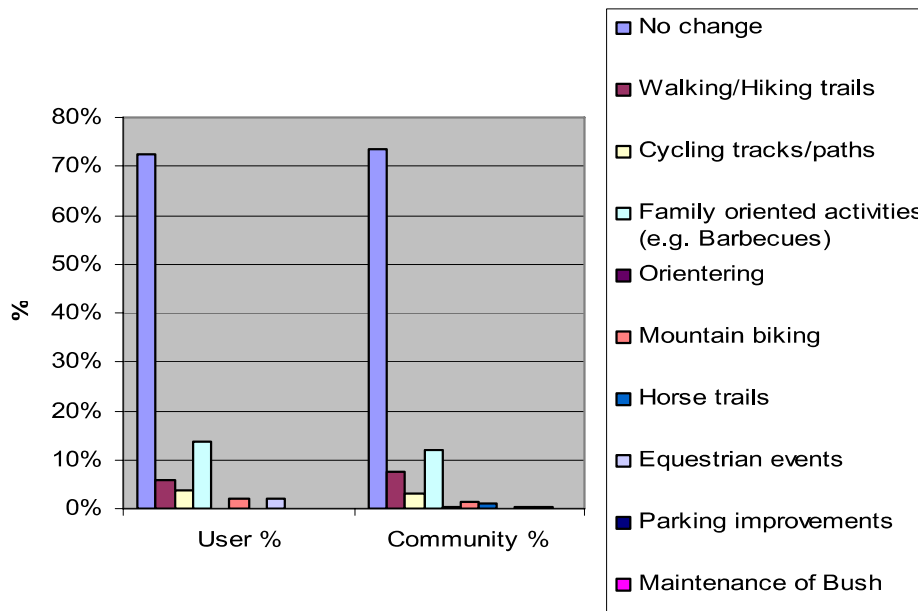


### 3.3.6 Suggested Improvements

When consulted about possible development options the feedback received is quite resounding, 'no change is necessary' was the response of more than 70% of respondents. Options identified for development included:

- Development of family orientated areas such as barbecues and playgrounds
- The development and management of walking and hiking trails

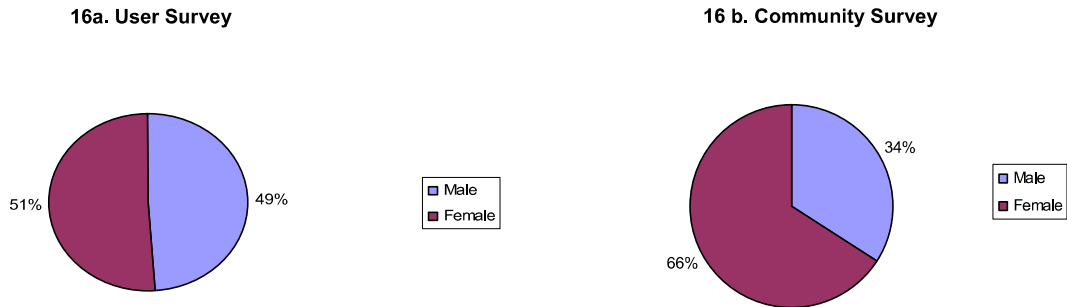
**Figure 15: Suggested improvements**



### 3.3.7 Study Sample

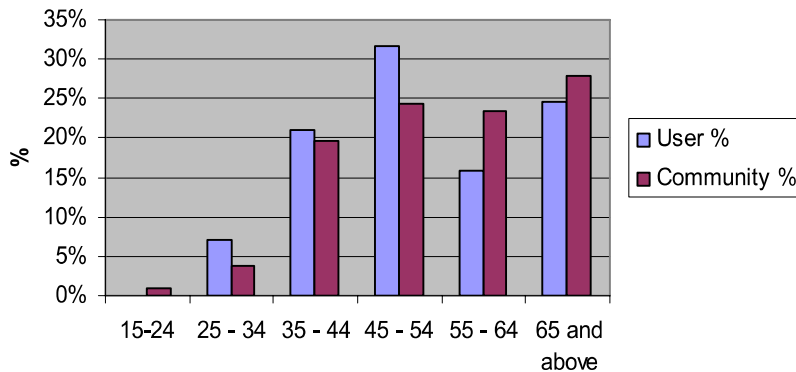
The sample from the community survey had nearly twice as many females responding to the surveys than males. This was not the case with the user survey where the genders were more evenly distributed.

**Figure 16: User profiles**



The age of participants is clearly greatest in the over-45 age categories, however, this is not to say that younger people do not use the facility. The researchers observed that when surveys were conducted on site, younger people were less prepared to participate in a survey compared to older people.

**Figure 16c Age groups of users**



Most park users are local and live in the 6076 postcode area (Lesmurdie/ Kalamunda), although a number of people are willing to travel from many different areas to visit Jorgensen Park. The use of a vehicle to get to the park is resounding at over 80%.

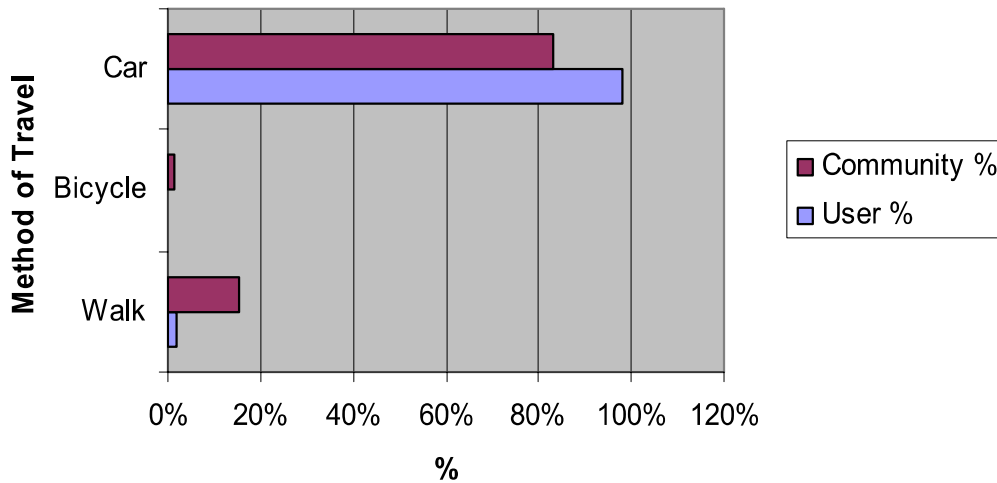
**Table 9: Home Postcodes of Park Visitors**

<b>Postcode – User Survey</b>	<b>Suburb</b>	<b>Number of visitors</b>
6076	Kalamunda/Lesmurdie/Pickering Brook	36
6104	Ascot/ Belmont	1
6058	Forrestfield	1
6057	High Wycombe/ Maida Vale	5
6562	Bakers Hill	1
6071	Glen Forrest	1
6008	Shenton Park/ Subiaco	1
6010	Claremont/ Swanbourne	1
6054	Bassendean	1
6020	Sorrento/ Marmion	1
6026	Kingsley/ Woodvale	1
6530	Geraldton	1
6024	Greenwood/ Warwick	1

<b>Postcode – Community Survey</b>	<b>Suburb</b>	<b>Number of visitors</b>
6076	Kalamunda/Lesmurdie/Pickering Brook	190
6004	East Perth	1
6103	Rivervale	1
6109	Maddington/Orange Grove	1
6057	High Wycombe/ Maida Vale	14
6058	Forrestfield	5
6059	Dianella	1
6071	Glen Forrest	1
6107	Welshpool	2
6147	Canningvale/ Parkwood/ Lynwood	1
6566	Toodyay	1
6056	Midland area	4
6051	Maylands	1
6062	Embleton/ Morley/ Noranda	1
6070	Darlington	1

The users of Jorgensen Park have been drawn from a wide number of postcodes across the metropolitan area. This data supports the idea that the park has the potential to attract a large number of visitors to the Kalamunda district.

Figure 17: Method of transport to Jorgensen Park



### 3.3.8 Anecdotal comments from the consultation process

The researcher was able to gather the following anecdotal information as a result of spending time in the park and communicating with users:

- The park is well liked by all age groups as a result of the sense of freedom that they could get from the park and the fact that it was an area that dogs were able to be let off their leads. Few of the interviewees expressed any negativity about the park, most of the comments received were positive or ideas for improvement.
- The condition of the toilets are poor, run down and dirty;
- Mothers visiting with children saw the play equipment as an “accident waiting to happen”;
- Users suggested fencing off the barbecue area as it would allow people to be free of dogs when people were eating and the area could remain free of dog excreta;
- Provision of seating in locations around the park was seen as a potential benefit, particularly for older users of the park who may wish to break up the walk around the park with a rest;
- Maps of the park and improved signage were thought to be beneficial given that the area was fairly large and not all users were completely familiar with the site; and
- The availability of water fountains in the park was seen as useful for both human and canine users.

### **3.3.9 Sporting Associations or Community Activities**

Responses from all of the sporting governing bodies who participated in the survey indicated a high level of recognition for the facilities at Jorgensen Park. Most of the groups either use the facility for parts of their programmes or had done so in the past. Very few adverse comments were received from the groups other than some of the common issues such as toilets and limited car parking.

The groups that were contacted included:

#### **WA Cycling Federation**

As the governing body with responsibility for all cycling events; road, track and mountain bike events the federation has a commitment to being aware of a wide range of venues. At the present time there are no events conducted in Jorgensen Park, however with venues being increasingly hard to find there are always opportunities being sought. Jorgensen Park is a location that would potentially lend itself to being a venue that could be used for a mountain bike event.

Events are run by the Cycling Federation all year round; these vary from cycling participation events with around 500 participants, cycling races that have 100 to 150 competitors and skills sessions that vary greatly in the numbers that they attract.

#### **Equestrian Federation of Australia Western Australia Branch**

Equestrian sports include show jumping, dressage and eventing (a combination of all disciplines). Jorgensen Park is not used at the present time by the Equestrian Federation but would present some potential as a venue for trail rides or as a cross country event. As the peak body for equestrian sports the Federation are always looking for opportunities to run competitions, particularly during the peak part of their season from April to October.

If an equestrian event was to be conducted in Jorgensen Park it is possible that there would be 30 to 250 participants. A limiting factor with regard to Jorgensen Park as a venue is that there would be a need for a high level of infrastructure, most of which is not readily available and therefore would need to be imported for a single event. In addition to the normal infrastructure that is required for events including car parking and toilets, equestrian events require stabling facilities, large parking facilities, vet facilities and ambulance capacity.

Realistically the most likely use of Jorgensen Park from an equestrian perspective is as a venue for trail riding. A major issue that is faced with regard to this is that the venue is so heavily used by dog owners, and there is a potential incompatibility between horses and dogs.

#### **Athletica (Athletics WA)**

Athletics WA have indicated that that there is no use of the facilities at Jorgensen Park other than one cross country event that is conducted by Little Athletics, (Belmont Centre). The venues for competitions such as cross country events are selected by the respective centres and not the governing body themselves. The venue is considered ideal for the purpose of cross country running. Events run by Little Athletics can have up to 500 participants.

The events run by Little Athletics in Jorgensen Park use the existing pathways and therefore offer no risk to environmentally sensitive areas within the facility. From an infrastructure

perspective the requirements for events such as cross country races are small, car parking and toilets being the most significant requests.

### **Polocrosse Association of Western Australia**

Polocrosse as an activity has some very specific facility requirements including flat grassed playing area, fencing around the playing arena, multiple playing areas at one location and support areas for the horses.

Jorgensen Park is not a venue that could accommodate Polocrosse as a sport.

### **Masters Athletics WA**

Jorgensen Park is a venue that is used by Veterans Athletics WA on an annual basis; once a year they conduct a cross country event for up to 100 competitors. The venue is considered quite satisfactory albeit that the car parking is inadequate and the toilet facilities are not the best.

The event formerly included use of the Community Learning Centre for a post race social function, however, the numbers of participants now competing mean that there is a need to use the Agriculture Hall as an alternative venue.

Masters Athletics as an association have a very full programme with events being conducted every weekend. It is unlikely that there would be much of an impetus for hosting additional events in Jorgensen Park.

### **Triathlon WA**

Triathlon WA does not presently host any events in Jorgensen Park, although the local club Rangers Triathlon Club do use the Community Learning Centre as a meeting venue. Whilst there are no events presently conducted it is believed that the venue would be ideal as the location for an early season duathlon event.

An event of this nature could expect to have up to 200 participants. Despite these reasonably large numbers the infrastructure requirements are not extensive; car parking and toilets are the most important and other specific elements such as presentation areas or access to power can be easily overcome.

One of the attractions of Jorgensen Park as a venue would be that the running course could be cross country which is not usual for many of the events; there are also benefits to conducting programmes in a venue where traffic management is not required. At the present time Triathlon WA conducts about 20 events per year and this is considered about right for their present membership base.

### **Scouts WA**

Events are conducted by Scouts WA in Jorgensen Park; the local district groups use the venue regularly for hiking, challenge activities and pioneering activities. Depending on what activities are being conducted there may be groups of 20 to 30 users in the park at different times for pursuits. The facility is ideal because of its highly accessible location.

The support facilities provided at the park are considered adequate to the needs of programmes conducted by the scouts. In the event that there was a major event to be held in the park, additional infrastructure would need to be brought into the venue.

Scouts WA have a large programme of events, the programme would include up to 50 events per year, and each district would be doing approximately 5 events per year. Membership of the Scouting movement is extensive across the state.

### **Western Australian Mountain Bike Association**

Jorgensen Park has been identified as a location that would be attractive to the Mountain Bike Association. It is envisaged that with its proximity to the metropolitan area the park would be an ideal location for junior groups or educational sessions. In the past the Mountain Bike Association has tried to use the facility for these sorts of events and have found the Shire's administration to be highly supportive.

The Association conducts events between March and October and would envisage that the number of participants would vary between about 50 and 200. If events were to be conducted in the park it is the opinion of the association that the public amenities would need to be improved as they are presently below an acceptable standard.

A comment provided by the Association was:

*"Visitors to the area will come from far and wide if the council is prepared to mark mountain bike trails that incorporate well built technical features and the great bush setting that is available. If tied in well with the overall trail master plan and the use of the Piesse Brook Valley to the east of the park, Kalamunda could offer the first well built/purpose built mountain bike trail area that offers visitors to the area a great place to ride. It would also give the Shire another piece of infrastructure that brings people to Kalamunda".*

Comments were sought from the peak bodies of Rogaining and Girl guides, however no responses were received.

Changes to uses of the park were not supported by the user survey and the community survey. The current uses of dog exercising, family activities, and bushwalking are strongly supported by the survey respondents, with cycling receiving a weak following.

The disadvantages of these activities include unrestrained dogs and dog excrement, the lack of signage to direct bushwalkers and the low standard of the family facilities. Cycling was seen to be in general conflict with the other uses of the park.

These disadvantages can be solved by separating the dogs and the families and encouraging dog walkers to clean up after their dogs. Signage can be developed to make this clear and to provide more direction for visitors to the park. Cycling should be restricted to specific advertised events or a cycling track/trail developed separate from the dogs, families and pedestrians. A general upgrade of facilities is required for the benefit of all park users.

## 4 MANAGEMENT STRATEGIES AND ACTIONS

The main objectives of this management plan are well stated by Wilkinson (1990):

‘to protect and enhance the conservation and landscape values of Jorgensen Park whilst meeting the recreational needs of the local community’.

The following chapter reviews the key issues and threats and includes recommended actions to address the issues and threats. These recommended actions are then listed in an implementation plan with budget estimates and timelines. This process will simplify budget planning for the five year timeframe of this report.

### 4.1 Key Issues and Threats

Jorgensen Park in Kalamunda is a unique outdoor natural facility that is well used by many local residents and well known by many of the relevant peak sporting and recreation organisations. The concept of maintaining the facility in its existing condition is fiercely protected by members of the community and users of the facility despite concerns about some of the support infrastructure (toilets, barbecues and playground equipment).

The key management issues addressed in the management of Jorgensen Park are listed under the main headings of environmental issues and recreation issues.

Environmental Issues include:

- Land Tenure and Management Zoning;
- Weed and pest control;
- Dieback disease;
- Erosion control;
- Fire management; and
- Access Control.

Recreation Issues include:

- Facility management;
- Signage;
- Support Infrastructure; and
- Access Issues.

## 4.2 Environmental Management Issues

### 4.2.1 Land Tenure and Management Zoning

It is clear that there is a potential for conflict of uses between the recreational uses and conservation purposes. Although the Shire of Kalamunda leases the land from the Western Australian Planning Commission (Metropolitan Regional Planning Authority) it has limited control over how the land is managed. Progression from a lease to a vested Management Order would improve the level of control exercised by the Shire. Decisions can then be made on the most responsible way to manage Jorgensen Park.

In view of recent correspondence with WAPC it would be preferable to undertake the following:

- To transfer management of the conservation areas listed in Figure 18 to the Department of Environment and Conservation (DEC) to be included into the adjoining national park,
- To accept management of the recreational areas of Jorgensen Park to allow the Shire of Kalamunda to continue providing the facilities valued by the park users.

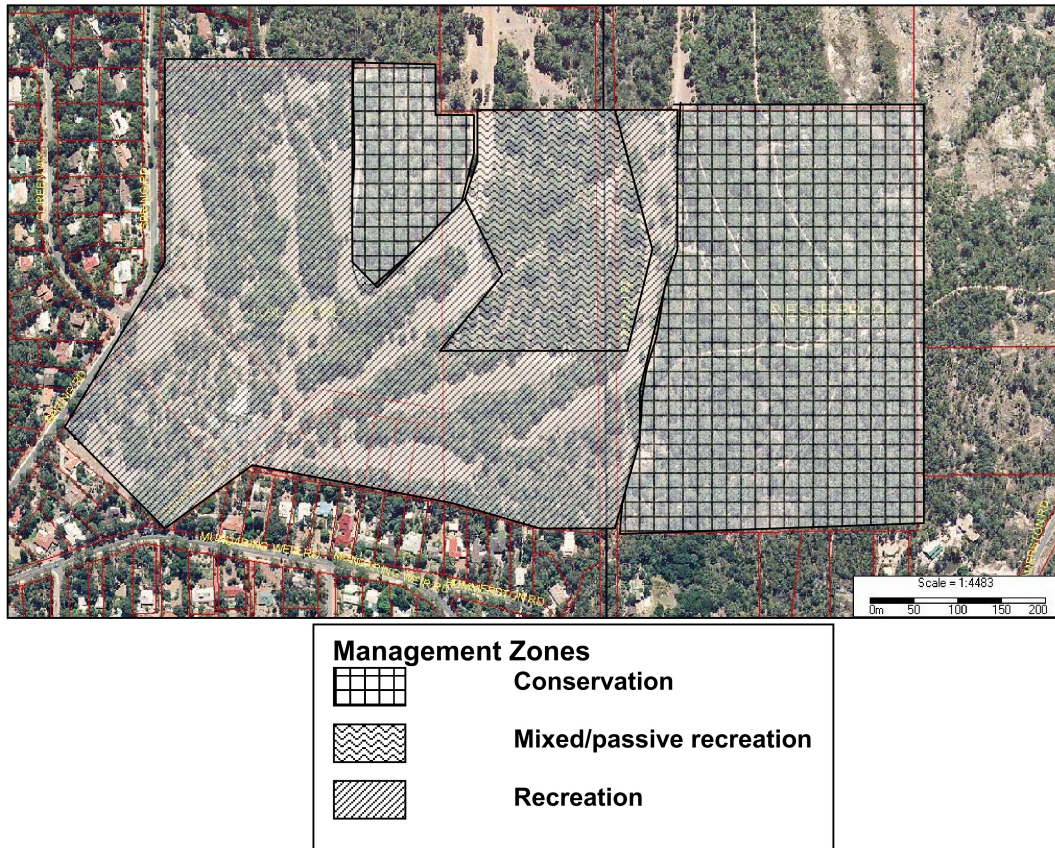
To provide the best outcomes for the environment and recreation it is proposed that areas are set aside for each of these primary uses. These are set out graphically in **Figure 18**. Areas that are considered highly degraded environmentally, essentially the western part of the reserve, have the best facilities for recreation. These include:

- The car park;
- The playground;
- The picnic area;
- The buildings and toilets; and
- The cleared fairways, ideal for walking dogs.

The areas to the east, along the edge of the national park, and the good condition bushland to the north are best managed for habitat conservation and biodiversity. Jorgensen Park is one of the most popular areas for exercising dogs off the leash. This practice should be discouraged in the conservation areas as the dogs have the potential to destroy native fauna and damage flora. This practice would not be allowed if this area was managed as part of the neighbouring national park.

A third area in the centre of the Park is in fair environmental condition, but is crossed by numerous tracks. This area would be ideal for mountain bikes or orienteering type recreational activities where users remain on the tracks. This portion should be retained by the Shire of Kalamunda.

**Figure 18: Management zones for Jorgensen Park**



**Recommendation 1:** To prevent potential conflicts arising over conservation and recreational uses by designating conservation and recreation management zones within the park through the following means:

- 1a) Request that the WAPC transfer management of the conservation areas listed in Figure 18 to the Department of Environment and Conservation (DEC), subject to the DEC's acceptance of the transfer, to be included into the adjoining national park.
- 1b) Seek a management order for the Shire for the recreational areas of Jorgensen Park to continue providing the facilities valued by the park users.
- 1c) Undertake the development of the management guidelines for the park in consultation with the Kalamunda community.

#### **4.2.2 Weed and Pest Control**

The grassed former fairways in the reserve provide open access into Jorgensen Park and wide expanses of green in winter. This grass is gradually invading the bushland and replacing the native understorey. This reduces the biological diversity of the park and reduces the affect of the park as a buffer zone to the nearby national park.

The creekline/drainage line in the park has become choked with weeds and is unsightly, creates a fire hazard and reduces the ecological function of the creek. Creekline maintenance will be high unless the weeds are controlled.

Numerous stands of planted, eastern state wattles and eucalypts can also be considered weeds in Jorgensen Park even though they were originally planted as part of the landscaping. This is because they seed readily and tend to spread into the bushland, replacing native species and

increasing bushfire fuel load problems. Most of the wattles are located at the narrow ends of the former fairways. Replacing these trees with local native species will increase the habitat and biodiversity value of these areas.

**Recommendation 2:** Implement weed and pest management measures by the following means:

- 2a) Manage the boundary between the conservation areas and grassed areas by implementing appropriate weed control measures.
- 2b) Undertake a staged weed control along the creekline in the western part of Jorgensen Park in conjunction with erosion control and rehabilitation works.
- 2c) Undertake a comprehensive weed control programme to reduce the occurrence of grassy weed species such as paspalum, especially where grasses are invading bushland.
- 2d) Gradually remove eastern states wattles and tagasaste bushes and replace with local native trees.
- 2e) Undertake follow up weed control especially near conservation zoned areas.

#### 4.2.3 Dieback Disease

Dieback disease is present across the entire vegetation within Jorgensen Park. This poses a disease threat to land adjoining the park and should be considered in relation to surrounding public and private properties. There is potential for any transfer of soil, on tyres, hooves, paws or shoes to spread this disease within the reserve or to other areas outside the reserve.

**Recommendation 3:** Inform the park users about the spread of dieback disease within Jorgensen Park, the surrounding Kalamunda National Park and private properties by the following means:

- 3a) Use signage to educate the users of the park of the risk that their activities may spread dieback disease around the reserve and onto their own properties.
- 3b) Advise users groups through bookings procedures of the risk that their activities may spread dieback disease around the reserve and onto their own properties, and include materials on how to avoid or minimise that risk.

#### 4.2.4 Erosion Control

The creekline in the western part of the park is degraded and deeply incised. It will continue to erode and remain weed infested unless foreshore management is undertaken. Other areas on steep tracks also require minor drainage modification to reduce erosion damage.

Erosion damage at the entry to the reserve from the carpark is currently a safety hazard. The ground is furrowed and set in loose gravel on a slope. Repairs to the surface will improve the safety factor in this area, improve wheelchair access and meet duty of care requirements.

**Recommendation 4:** Undertake erosion control by stream and firebreak management by the following means:

- 4a) Rehabilitate the creekline by stabilising and revegetating the banks in conjunction with weed control activities.
- 4b) Undertake minor drainage control on steep firebreaks to prevent erosion.
- 4c) Improve access to the park from the parking area to reduce the safety hazard.

#### 4.2.5 Fire Management

Fire management strategies (or actions) will address **prevention, response and rehabilitation** strategies in the event of fire. Future control burns in Jorgensen Park need to be carried out to ensure that no area is burnt more frequently than the vegetation can sustain. The current recommended length of time between controlled burns (of medium intensity) in Dwellingup 2 vegetation complex is a minimum of 6-8 years in upland areas and 12-16 years for valley floor and riparian areas (Burrows, 1990). Adhering to this frequency as a minimum will assist in maintaining and protecting the biodiversity of the area.

- Prevention Strategies:
  - Controlling access to bushland– fences/bollards/gates to exclude discourage undesirable activities in bush areas (allow access to firebreaks etc);
  - Separate risk areas – eg barbecue facilities – gas barbecues not wood, possible low fuel area surrounding barbecue/playground area.
  
- Preparedness Strategies:
  - Fire access tracks – location, condition, trafficable, safe for firefighters,
  - Environmental considerations (erosion, weed invasion, dieback infection, hydrology, ecological communities, fauna, flora, minimising disturbance),
  - Firebreak requirements (local government, firebreak requirements – *Bush Fires Act 1954* and *Local Government Act 1995*)
  - Weed reduction and control
  - Fuel load monitoring and reduction
  - Relocating people (wildfire contingency plans – people and traffic movement)
  - Early response plans – encourage community involvement in management, for eg., to report fires in the bushland
  
- Response Strategies: FESA, Local Government, CALM Incident controllers – fire plan
  
- Recovery Strategies: Debriefing
  - Record - documentation, visuals, aerial photographs
  - Investigate cause
  - Assess safety of public facilities
  - Rescue affected animals
  - Preventing weed invasion
  - Controlling access to burnt out areas
  - Erosion Control
  - Regeneration initiatives
  - Community involvement

**Recommendation 5:** Undertake fire management by developing and implementing a prevention, response and rehabilitation plan incorporating the following strategies:

5a) Continue fire risk reduction measures at current frequencies – mowing fairways and maintaining fire break condition.

5b) Undertake mosaic control burning at frequencies which do not degrade the condition of the vegetation.

5c) Give priority to weed control following fires, either wild or controlled, to reduce the impact of introduced species on biodiversity and fire risk.

See also recommendations under Weed Management and Access Control.

#### 4.2.6 Access Control

There are three access-related issues at Jorgensen Park. These are;

- Access for fire control vehicles in case of an emergency;
- Access for park users into the park; and
- Reduction in access for undesirable uses, eg. motorcycle riders.

The Fire Officers at the Shire of Kalamunda report that the emergency fire access for fast attack vehicles is adequate. These tracks continue to need regular maintenance.

Improvement of park access for users is discussed in the erosion **section 4.2.4**.

Reduction in access for undesirable users would require extensive fencing at considerable cost to the Shire. Large scale fencing would also change the ambience of the reserve and would not be welcomed by the community (See **section 3.3.6**).

Fencing off the playground/picnic area would have benefits including:

- Separating small children from unrestrained dogs;
- Separating food preparation and eating areas from unrestrained dogs;
- Provide a secure area for small children; and
- Minimising animal excrement in the area.

**Recommendation 6:** Implement access control measures including:

- 6a) Fence the playground barbecue area to provide a family focussed area free from unrestrained dogs.
- 6b) Provide seating at suitable points in the park.
- 6c) Investigate suitable locations for the provision of a water fountain, with separate outlets for human use and for dog use within the park.

### 4.3 Recreation

#### 4.3.1 Facility Management

Officers at the Shire of Kalamunda have undertaken basic management of the facility, through the formalisation of booking procedures. This process will help ensure the satisfaction of the customers/park users and limit confusion in the event of an accident or multiple events trying to use the facility at the same time.

There is potential for Jorgensen Park to be managed at a higher level by the Shire of Kalamunda. The limited management provided by the Shire is accepted by the local community who have a preference for management as opposed to more active development occurring in the park.

Jorgensen Park can be improved by updating park infrastructure, signage, and maintenance of the support infrastructure.

If Jorgensen Park can subtly evolve as a destination park with a balanced approach to management which includes retaining its natural state and undeveloped beauty while also

pursuing an improved level of facility provision, there could be some economic benefit to the district by the attraction of users to Jorgensen Park.

**Recommendation 7:** Develop and implement management and communication strategies that retain the attractions of Jorgensen Park and address the issues identified in the survey by the following means:

- 7a) Promote the attractions of Jorgensen Park and increase usage of the facilities in order to manage the park effectively.
- 7b) Promote Jorgensen Park as a destination park with specific characteristics to attract users.
- 7c) Promote park events to the general Shire of Kalamunda community.
- 7d) Develop a set of guidelines for acceptable activities within the park and for the staging of events procedure.
- 7e) develop and implement a booking system for key facilities/uses.
- 7f) Encourage a wider range of compatible users to be part of the Jorgensen Park community including sport and recreation users, educational groups and flora and fauna groups.
- 7g) Manage events conducted in the park as part of a larger calendar of events to promote awareness of events by the general community.
- 7h) Consider setting aside specific areas or trails to separate different users with specific and non-compatible needs such as horse-riders, cyclists and dog walkers.

#### 4.3.2 Signage

There is a lack of clarity as to what the permitted activities are for Jorgensen Park. There will be conflict between users as there is no information provided about what can and cannot be done.

Signage at the park is limited and while there are signs that do provide some indication of the rules pertaining to horses and dogs there is no certainty provided as to how users are expected to behave.

**Figure 19: Inadequate signage within Jorgensen Park**



**Recommendation 8:** Improve information and management signage at entry points and within the park by the following means:

- 8a) Enhance the information signage throughout the park to include management information, including dieback risk, at the entry points; and directional and point of interest signage within the facility.
- 8b) Encourage users to protect fauna and flora by keeping unrestrained dogs within the recreation zone.

### 4.3.3 Support Infrastructure

Maintenance to the support infrastructure could be improved. Key issues about the maintenance identified in the survey include:

- Condition and cleanliness of the public toilet facilities;
- Quality of the barbecues and dog access to the barbeque area;
- Physical access to the park from the car park;
- Design and level of maintenance of barbecue tables providing a potential hazard; and
- Outdated playground equipment that should be replaced to comply with contemporary safety standards.

**Figure 20: Picnic table in Jorgensen Park**



**Recommendation 9:** Upgrade the support infrastructure in Jorgensen Park including:

- 9a) Upgrade the support infrastructure in Jorgensen Park, specifically the toilets, picnic table/s and playground equipment.
- 9b) Prepare a disabilities access implementation plan (DAIP) to upgrade the park access to enable people with disabilities to have access to the park.
- 9c) Provide seating at suitable points in the park.

#### 4.3.4 Access Issues

Access issues have previously been discussed in the Environmental Management section with regards to fire access and motorbike access **section 4.2.5** and **section 4.2.6**. Park access issues have also been discussed in the erosion control **section 4.2.4**. The photographs below illustrate the issues with loose gravel and highlight the potential difficulties for someone with disabilities.

**Figure 21: Loose gravel and eroded areas at access point**



**Figure 22: Poor access at edge of carpark**



## 5 Implementation Plan

The action plan below represents a consolidation of priority strategies identified in the previous section to assist with the implementation of the management plan. The action plan includes responsibilities, timeframes and estimated costs so that sufficient budgets can be set aside to ensure that implementation progresses at a satisfactory rate.

Simple management actions including weed control, dieback control and fire control appropriate to be undertaken as core business using recurrent budget allocations could be undertaken with minimal cost implications. Additional costs for the non-recurring budget or requiring grant contributions (in italics) would require considerable design and planning phases.

**Table 10: Implementation Plan**

Management Zone and Actions	Responsibility	Time Frame	Estimated Costs to Shire of Kalamunda
<b>Land tenure and management zoning</b>			
1. Prevent potential conflicts arising over conservation and recreational uses by designating conservation and recreation management zones within the park through the following means:			
1a) Request that the WAPC transfer management of the conservation areas listed in Figure 18 to the Department of Environment and Conservation (DEC), subject to the DEC's acceptance of the transfer, to be included into the adjoining national park.	Chief Executive Officer	2007/2008	Not calculated
1b) Seek a management order for the Shire for the recreational areas of Jorgensen Park to continue providing the facilities valued by the park users.	Chief Executive Officer	2007/2008	Not calculated
1c) Undertake the development of the management guidelines for the park in consultation with the Kalamunda community.	Recreation/ Community Services/ Environmental Services	On-going	
<b>Weed and Pest Control</b>			
2. Implement weed and pest management measures by the following means:			
2a) Manage the boundary between the conservation areas and grassed areas by implementing appropriate weed control measures.	Environmental Service/Parks Maintenance/Bush Crew	On-going	\$3000 - 2008 \$2000 <sup>1</sup> - 2009 \$1500 - 2010 \$1000 - 2011
2b) Undertake a staged weed control along the creekline in the western part of Jorgensen Park in conjunction with erosion control and rehabilitation works.	Environmental Service/NRM Officers	Summer and Autumn 2008	\$3,000
2c) Undertake a comprehensive weed control programme to reduce the occurrence of grassy weed species	Environmental Service/Parks Maintenance/Bush Crew	On-going	

<sup>1</sup> Note: Italicised are not included in current budgets for the park.

<b>Management Zone and Actions</b>	<b>Responsibility</b>	<b>Time Frame</b>	<b>Estimated Costs to Shire of Kalamunda</b>
such as paspalum, especially where grasses are invading bushland.			
2d) Gradually remove eastern states wattles and tagasaste bushes and replace with local native trees.	Environmental Service/ Parks Maintenance and Bush Crew	On-going, Weed Strategy	\$1000 for 3 Years
2e) Undertake follow up weed control especially near conservation zoned areas.	Environmental Service	Ongoing, Weed Strategy	\$1000
<b>Dieback Disease</b>			
3. Inform the park users about the spread of dieback disease within Jorgensen Park, the surrounding Kalamunda National Park and private properties by the following means:			
3a) Use signage to educate the users of the park of the risk that their activities may spread dieback disease around the reserve and onto their own properties.	Environmental Service	On-going	\$1500 for sign <i>Seek external funding</i>
3b) Advise users groups through bookings procedures of the risk that their activities may spread dieback disease around the reserve and onto their own properties, and include materials on how to avoid or minimise that risk.	Environmental Service	On-going	\$2000 for brochure. <i>Seek external funding</i>
<b>Erosion Control</b>			
4. Undertake erosion control by stream and firebreak management by the following means:			
4a) Rehabilitate the creekline by stabilising and revegetating the banks in conjunction with weed control activities.	Environmental Service, Friends Group	Summer 2008	See (4)
4b) Undertake minor drainage control on steep firebreaks to prevent erosion.	Engineering Services	Summer 2008	\$1000 if contracted
4c) Improve access to the park from the parking area to reduce the safety hazard.	Environmental Service, Parks Maintenance	Summer 2008	\$1,500
<b>Fire Management</b>			
5. Undertake fire management by developing and implementing a prevention, response and rehabilitation plan incorporating the following strategies:			
5a) Continue fire risk reduction measures at current frequencies – mowing fairways and maintaining fire break condition.	Environmental Service/ Ranger Service/ Parks Maintenance	On-going	
5b) Undertake mosaic control burning at frequencies which do not degrade the condition of the vegetation.	Ranger Service / Fire Control Officers/ Local Brigade	On-going	
5c) Give priority to weed control following fires, either wild or controlled, to reduce the impact of introduced species on biodiversity and fire risk.	Environmental Service / Ranger Service		
<b>Access Control</b>			
6. Implement access control measures including:			
6a) Fence the playground barbecue area to provide a family focussed area	Recreation and Community Service	2008/09	\$30,000

<b>Management Zone and Actions</b>	<b>Responsibility</b>	<b>Time Frame</b>	<b>Estimated Costs to Shire of Kalamunda</b>
free from unrestrained dogs.			
6b) Provide seating at suitable points in the park.	Parks Maintenance and Recreation/ Community Service	2008/09	\$700 per seat
6c) Investigate suitable locations for the provision of a water fountain, with separate outlets for human use and for dog use within the park	Parks Maintenance and Recreation/ Community Service		
<b>RECREATION MANAGEMENT</b>			
<b>Facility Management</b>			
7. Develop and implement management and communication strategies that retain the attractions of Jorgensen Park and address the issues identified in the survey by the following means:			
7a) Promote the attractions of Jorgensen Park and increase usage of the facilities in order to manage the park effectively.	Recreation/ Community Services	On-going	
7b) Promote Jorgensen Park as a destination park with specific characteristics to attract users.	Recreation/ Community Services	On-going	
7c) Promote park events to the general Shire of Kalamunda community.	Recreation/ Community Services	On-going	
7d) Develop a set of guidelines for acceptable activities within the park and for the staging of events procedure.	Recreation/ Community Services	On-going	
7e) develop and implement a booking system for key facilities/uses.	Recreation/ Community Services	On-going	
7f) Encourage a wider range of compatible users to be part of the Jorgensen Park community including sport and recreation users, educational groups and flora and fauna groups.	Environmental Services	On-going	
7g) Manage events conducted in the park as part of a larger calendar of events to promote awareness of events by the general community.	Recreation/ Community Services	On-going	
7h) Consider setting aside specific areas or trails to separate different users with specific and non-compatible needs such as horse-riders, cyclists and dog walkers.	Recreation/ Community Services and Environmental Service	2008/2009	Staged \$100,000
<b>Signage</b>			
8. Improve information and management signage at entry points and within the park by the following means:			
8a) Enhance the information signage throughout the park to include management information, including dieback risk, at the entry points; and directional and point of interest signage within the facility.	Environmental Services/ Recreation/ Community Services	On-going	\$3,000
8b) Encourage users to protect fauna and flora by keeping unrestrained dogs within the	Environmental Service	On-going	

Management Zone and Actions	Responsibility	Time Frame	Estimated Costs to Shire of Kalamunda
recreation zone.			
<b>Support Infrastructure</b>			
9. Upgrade the support infrastructure in Jorgensen Park including:			
9a) Upgrade the support infrastructure in Jorgensen Park, specifically the toilets, picnic table/s and playground equipment.	Recreation/ Community Services	Toilets Playground BBQ's and picnic tables	<i>\$150,000</i> <i>\$100,000</i> <i>\$100,000</i>
9b) Prepare a disabilities access implementation plan (DAIP) to upgrade the park access to enable people with disabilities to have access to the park.	Recreation/ Community Services	Access plan	<i>\$20,000</i>
9c) Provide seating at suitable points in the park.	Parks Maintenance and Recreation/ Community Service	2008/09	<i>\$700</i> per seat

\* **Italicised costs are not included in any current budget**

Simple management actions including weed control, dieback control and fire control appropriate to be undertaken as core business using recurrent budget allocations could be undertaken with minimal cost implications. Additional costs for the non-recurring budget or requiring grant contributions (in italics) would require considerable design and planning phases.

## Conclusion

Jorgensen Park has important environmental and recreational values within the Shire of Kalamunda. The establishment of distinct management zones within the park will enhance and maintain the environmental and recreational values of Jorgensen Park.

The recommended management practices will ensure that the park maintains and improves its biodiversity and conservation values; maintains and improves its recreational values and facilitates park usage for the broader community.

### 5.1 Management Recommendations

The broad management objectives for Jorgensen Park are:

1. The protection and enhancement of the biodiversity within Jorgensen Park
2. The improvement of the recreational aspects of Jorgensen Park.

These broad management objectives can be achieved through specific implementation of the following management strategies:

1. To prevent potential conflicts arising over conservation and recreational uses by designating conservation and recreation management zones within the park. Non degraded areas of the park to be set aside for conservation purposes and the more degraded areas to be set aside for recreational purposes.
2. Implementation of weed control measures:
  - To manage the boundary between conservation and recreational areas;
  - To improve the condition of the creekline through weed removal and rehabilitation;
  - The removal of eastern states weeds and replacing with local native species; and
  - Undertake follow up control measures particularly near conservation zoned areas.
3. To educate users about spreading dieback:
  - To inform the park users of the potential their activities have to spread dieback disease within Jorgensen Park, the surrounding Kalamunda National Park and private properties; and
  - To monitor the spread of dieback disease within Jorgensen Park.
4. To undertake erosion control by:
  - Rehabilitating the creekline by stabilising and revegetating the stream;
  - Undertaking minor drainage control on steep firebreaks ; and
  - Improving access to park from parking area to reduce safety hazard.
5. To undertake fire management by:
  - Continuing the current fire risk reduction measures by mowing fairways and maintaining fire breaks;
  - Undertaking mosaic control burning at frequencies which do not degrade the condition of the vegetation;

- Prioritising weed control following fires, either wild or controlled, to reduce the impact of introduced species on biodiversity and fire risk;
  - Implementing a staged weed spraying and revegetation programme to be undertaken on drainage lines to reduce the amount of dry plant material present through summer (eg. introduced grasses)
  - Undertaking a comprehensive weed control programme to reduce the occurrence of these species (especially where introduced grasses are invading bushland).
6. To implement access control measures by fencing off the playground/barbecue area to prevent dogs entering the area and by providing seating at suitable points in the park.
7. To improve the Facility management at Jorgensen Park:
- To implement management and communication strategies to promote the attractions of Jorgensen Park and manage the park effectively;
  - That Jorgensen Park be designated as a destination park with suitable support facilities and that the Shire consider developing a marketing strategy for the park;
  - A wider range of compatible users be encouraged to be part of the Jorgensen Park community including sport and recreation users, educational groups and flora and fauna groups; and
  - The management and promotion of park events by the Shire of Kalamunda to inform the general community.
8. To put more information and management signage at entry points and within the park:
- That the information signage throughout the park be enhanced to include management information signage at the entry points and directional and point of interest signage within the facility;
  - To develop a set of guidelines for acceptable activities within the park and provide a booking and staging of events procedure; and
  - To undertake community consultation with the Kalamunda community when developing the management guidelines for the park.
9. That the Shire of Kalamunda upgrade the support infrastructure in Jorgensen Park:
- To upgrade the toilet facilities;
  - To upgrade the playground ; and
  - To provide BBQ's and picnic areas throughout the park.

**Table 11: Summary Activities by Year**

<b>Year</b>	<b>Item</b>	<b>Cost</b>
2007/2008	<ul style="list-style-type: none"> <li>• Weed control - grasses</li> <li>• Creek rehabilitation</li> <li>• Weed control – trees</li> <li>• Dieback brochure, signs</li> <li>• Erosion control</li> <li>• Park access from carpark</li> <li>• Information signage</li> <li>• Access plan</li> </ul>	\$3000 \$3000 \$1000 \$3500 \$1000 \$1500 \$3000 \$20,000
<b>Total</b>		<b>\$36,000</b>
2008/2009	<ul style="list-style-type: none"> <li>• Weed control – grasses</li> <li>• Weed control – trees</li> <li>• Weed control follow up</li> <li>• Fence playground, BBQ</li> <li>• Provide seating x 4</li> <li>• Trail provision – staged</li> <li>• Upgrade toilets</li> </ul>	\$2000 \$1000 \$1000 \$30,000 \$2800 \$50,000 \$150,000
<b>Total</b>		<b>\$236,800</b>
2009/2010	<ul style="list-style-type: none"> <li>• Weed control – grasses</li> <li>• Weed control – follow up</li> <li>• Trail provision - staged</li> <li>• Upgrade playground</li> <li>• BBQ and picnic tables</li> </ul>	\$1500 \$1000 \$50,000 \$100,000 \$100,000
<b>Total</b>		<b>\$252,500</b>

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## 7 Appendix 1 - Consultation Contacts

Name	Company & Address	Phone #	Email
<b>Primary Stakeholders</b>			
	Shire of Kalamunda	9257 9999	<a href="mailto:kala.shire@kalamunda.wa.gov.au">kala.shire@kalamunda.wa.gov.au</a>
<b>Secondary Stakeholders</b>			
	Kalamunda Community Learning Centre PO Box 116 KALAMUNDA WA 6926		
	After School Arts 18 Robertson Road GOOSEBERRY HILL WA 6076		
Alison Colman	Derawish El Tanoura 76 Coral Road KALAMUNDA WA 6076	9293 0421 9293 1300 0429 330 397	
	Department of Conservation and Land Management	9295 1955	
	Department of Sport and Recreation PO Box 66 WEMBLEY WA 6913	9387 9700	
Steve Gates	Nature Reserves Preservation Group GOOSEBERRY HILL WA 6076		
	Walk Trails Interest Group		
John Carney	Western Australian Mountain Bike Association PO Box 143, Cannington WA 6107	9277 1417 0407 932 513	<a href="mailto:johncarney@primefunding.com.au">johncarney@primefunding.com.au</a>
Tony Simpkins	WA Orienteering Development Officer	9228-0085 0417 919 513	<a href="mailto:simmo@iinet.net.au">simmo@iinet.net.au</a>
	Walliston Riding and Pony Club		
Masters Athletics WA	Secretary 11A Dandenong Road Attadale WA 6156	9330 3803	<a href="mailto:enquiries@mastersathleticswa.org">enquiries@mastersathleticswa.org</a>
	Lesmurdie Lions Club		
	Relevant Environmental Friends Groups		
	General community - those who exercise dogs or use the area for walking or other recreation		

## 8 Appendix 2 - Survey Forms

### Association/Club Survey Jorgensen Park - Kalamunda



1. Name of the Association or Group

---

2. Activity or sport provided

---

3. Does your sport or activity use Jorgensen Park, Kalamunda?

Yes  Go to question 4      No

a) **If no**, would you like to? (what activity/ies) - **Then go to question 9 a**

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---

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4. How often does your association /group currently use Jorgensen Park?

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5. What is the purpose of the activity for which you use Jorgensen Park? (i.e. Is it for practice/training or do you hold events there?)

---

---

---

6. What time of year do you conduct your event?

---

---

---

7. Are you satisfied with the level of access you receive to Jorgensen Park?

---

---

---

8. How many people are involved with the event/s that you conduct at Jorgensen Park?  
(approximate number).

---

9. a) What infrastructure would you need or do you require to conduct an event at Jorgensen Park?

---

b) Is the level of infrastructure at Jorgensen Park satisfactory to your needs?

---

10. What comments would your group like to make with regard to the management of Jorgensen Park.

---

11. What is the membership number of your association/club/group?

---

12. a) How many events do you normally conduct throughout the year at Jorgensen Park?

---

b) How many events would you like to hold during any year at Jorgensen Park?

---

13. Any other comments you would like to make with regard to Jorgensen Park.

---

**Name:** \_\_\_\_\_ **Position Held:** \_\_\_\_\_  
**Contact Number:** \_\_\_\_\_

# User Survey Jorgensen Park - Kalamunda



1. Have you already completed a Jorgensen Park community survey form from the Shire of Kalamunda libraries or off the web site? (Tick box)

Yes                       No

2. How frequently do you visit/attend Jorgensen Park? (Tick box)

Daily	<input type="checkbox"/>
Weekly	<input type="checkbox"/>
Monthly	<input type="checkbox"/>
Approximately 4 times a year	<input type="checkbox"/>
Once a year	<input type="checkbox"/>
Less than once a year	<input type="checkbox"/>
I don't	<input type="checkbox"/>

3. What day/s of the week do you usually attend Jorgensen Park?

Please tick box if there is no specific pattern to your usage of the park.

Day of the Week	Tick Box	Purpose of Visit
<b>Monday</b>	<input type="checkbox"/>	
<b>Tuesday</b>	<input type="checkbox"/>	
<b>Wednesday</b>	<input type="checkbox"/>	
<b>Thursday</b>	<input type="checkbox"/>	
<b>Friday</b>	<input type="checkbox"/>	
<b>Saturday</b>	<input type="checkbox"/>	
<b>Sunday</b>	<input type="checkbox"/>	

4. a) Number of people you visit the park with (if any). (Tick box)

Do you visit the park on your own	<input type="checkbox"/>
With another person	<input type="checkbox"/>
With your family	<input type="checkbox"/>
As part of a larger/organised group	<input type="checkbox"/>

b) If a combination of the above please outline.

c) If you attend with an organised group please provide details of the group.

---

5. Do you visit or attend other park(s) in the Shire of Kalamunda? (Tick box)

Yes

No

[Go to Question 7](#)

6. a) Which other park(s) do you visit?

---

b) Approximately how often do you visit other park(s)?

---

c) What is the purpose for visiting other park(s)?

---



---



---

7. What are the attributes that attract you to Jorgensen Park?

If you select more than one please prioritise your selections with one (1) being the most important.

ATTRIBUTES OF JORGENSEN PARK	SELECTIONS (Numbers 1-3)
Natural Bush	
Open Space	
Wildflowers/Fauna/Flora	
Dogs allowed off leash	
Peaceful and quiet	
Variety of walks and usage	
Scenery/Views	
Close to home	
Undeveloped/Unorganised/Unstructured	
Size	
Attend/use the cottage or pavilion	
Good car parking	
Other (please state)	

8. As a user what do you see are the shortcomings of Jorgensen park?  
 If you select more than one please priotitise your selections with one (1) being the most important.

SHORTCOMINGS OF JORGENSEN PARK	SELECTION
None	
Horses	
Weeds	
Dog excrement	
Horse excrement	
Development in the park	
Overcrowded by people	
Poorly controlled dogs	
Lack of a defined trails plan	
Litter	
Lack of car park security	
Motorbikes/Cyclists in the park	
Condition/lack of playground equipment	
Condition/lack of pavilion facilities	
Condition/lack of cottage facilities	
Condition of public toilets	
Barbecue facilities	
Lack of picnic area	
Lack of seating	
Lack of information signage and directional signage	
Lack of shade	
Other (please state)	



65 and above

c) Postcode of the address at which you reside.

---

d) How do you normally travel to Jorgensen Park?

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---

# Community Survey Jorgensen Park - Kalamunda



1. Have you used/visited Jorgensen Park in the last three (3) years. (Tick box)

Yes  Go to question 1 a) No  Go to question 1 b)

1 a) **If yes**, how many years ago? (Tick box)

3 years ago   
2 years ago   
In the last 12 months

1 b) If no, please give reason why not and **GO TO QUESTION 3**

---

---

---

2. a) How frequently do you visit/attend Jorgensen Park? (Tick box)

Daily   
Weekly   
Monthly   
Approximately 4 times a year   
Once a year   
Less than once a year   
I/we don't

b) Do you visit the park on your own   
With another person   
With your family   
As part of a larger/organised group



4. What are the attributes of Jorgensen Park that attract you to it?

If you select more than one attribute please prioritise your selections with one (1) being the most important.

<b>ATTRIBUTES OF JORGENSEN PARK</b>	<b>SELECTION</b>
Natural Bush	
Open Space	
Wildflowers/Fauna/Flora	
Dogs allowed off leash	
Peaceful and quiet	
Variety of walks and usage	
Scenery/Views	
Close to home	
Undeveloped/Unorganised/Unstructured	
Size	
Attend/use the cottage or pavilion	
Good car parking	
Other (please state)	

5. As a user what do you see are the shortcomings of Jorgensen Park?

If you select more than one please prioritise your selections with one (1) being the most important.

<b>SHORTCOMINGS OF JORGENSEN PARK</b>	<b>SELECTION</b>
None	
Horses	
Weeds	
Dog excrement	
Horse excrement	
Development in the park	
Overcrowded by people	
Poorly controlled dogs	
Lack of defined trails	
Lack of information signage and directional signage	
Litter	

Car park security	
Motorbikes/Cyclists in the park	
Poor condition of facilities (playground equipment, B.B.Q, toilets, pavilion, cottage)	
Lack of seating	
Lack of shade	
Other (please state)	

6. What are your top three (3) preferences for change that you would like to see in Jorgensen Park?

**Please prioritise your selections with one (1) being the most important.**

<b>TYPES OF RECREATION DEVELOPMENT</b>	<b>SELECTIONS (Numbers 1-3)</b>
No change	
Walking/Hiking trails	
Cycling tracks/paths	
Family oriented activities (e.g. Barbecues)	
Athletic/cross country events	
Orienteering	
Mountain biking	
Horse trails	
Equestrian events and/or facilities	
Other (please state)	

7. Please make any general comments about the future usage of Jorgensen Park.

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## 9 Appendix 3 - Letter from Western Australian Planning Commission



Our Ref: 805/02/24/0001V4  
Enquiries: 9264 7532  
Email: ryan.zaknich@dpi.wa.gov.au



Dept of Environment and Conservation  
State Operations  
Attn: Alex Errington  
17 Dick Perry Ave  
KENSINGTON WA 6151

Dear Alex

### **Jorgensen Park – Old Kalamunda Golf Course, Kalamunda**

The former Metropolitan Region Planning Authority, now Western Australian Planning Commission, purchased the properties that once made up part of the Kalamunda Golf Course, as shown on the attached map, in 1977, for the purpose of Parks and Recreation under the Metropolitan Regional Scheme.

This area is known as Jorgensen Park and adjoins Kalamunda National Park.

Further to the Land owned by the Commission, part of the old golf course is located on Unallocated Crown Land Canning Location 1237.

Jorgensen Park is a popular passive recreational area for local residents. The old clubhouse is used as a community facility for child playgroup along with other community groups. Along with this, dog walking is a very popular activity in the park, with the areas that were once golf fairways used to exercise pets.

The Commission is constantly reviewing its landholding, and wishes to approach the DEC over the matter of permanent management of the area.

It will be proposed to have a new reserve created over the area containing the old clubhouse, which would have a management order in favour of the Shire of Kalamunda.

Furthermore, we propose to have the balance of the Commissions land, as well as the UCL transferred to the Crown and vested with the Conservation Commission, for incorporation into Kalamunda National Park.

In addition, Lots 50, 130, 131, 132, 965 and 968, which are owned by the Commission, but managed by DEC in accordance with the s16 agreement, would be proposed to be transferred to the crown and management orders issued in favour of the Conservation Commission.

We would seek approval to have closed the portions of unmade road reserves of Roach Rd, Crescent Rd, Schipp Rd and Elson Rd, which are located on Parks and Recreation zoned land, for incorporation into the National Park.



Albert Facey House, 469 Wellington Street (cnr Forrest Place), Perth, Western Australia 6000  
Tel: (08) 9264 7777; Fax: (08) 9264 7566; TTY: (08) 9264 7535; Infoline: 1800 626 477  
e-mail: corporate@wapc.wa.gov.au; web address: <http://www.wapc.wa.gov.au>  
ABN 35 482 341 493

In principal support has been discussed with the Shire, and they have agreed to further discussions at Council subject to further support by DEC.

We seek your support on this matter, and should you have any queries regarding this, please do not hesitate to contact me on 9264 7532.

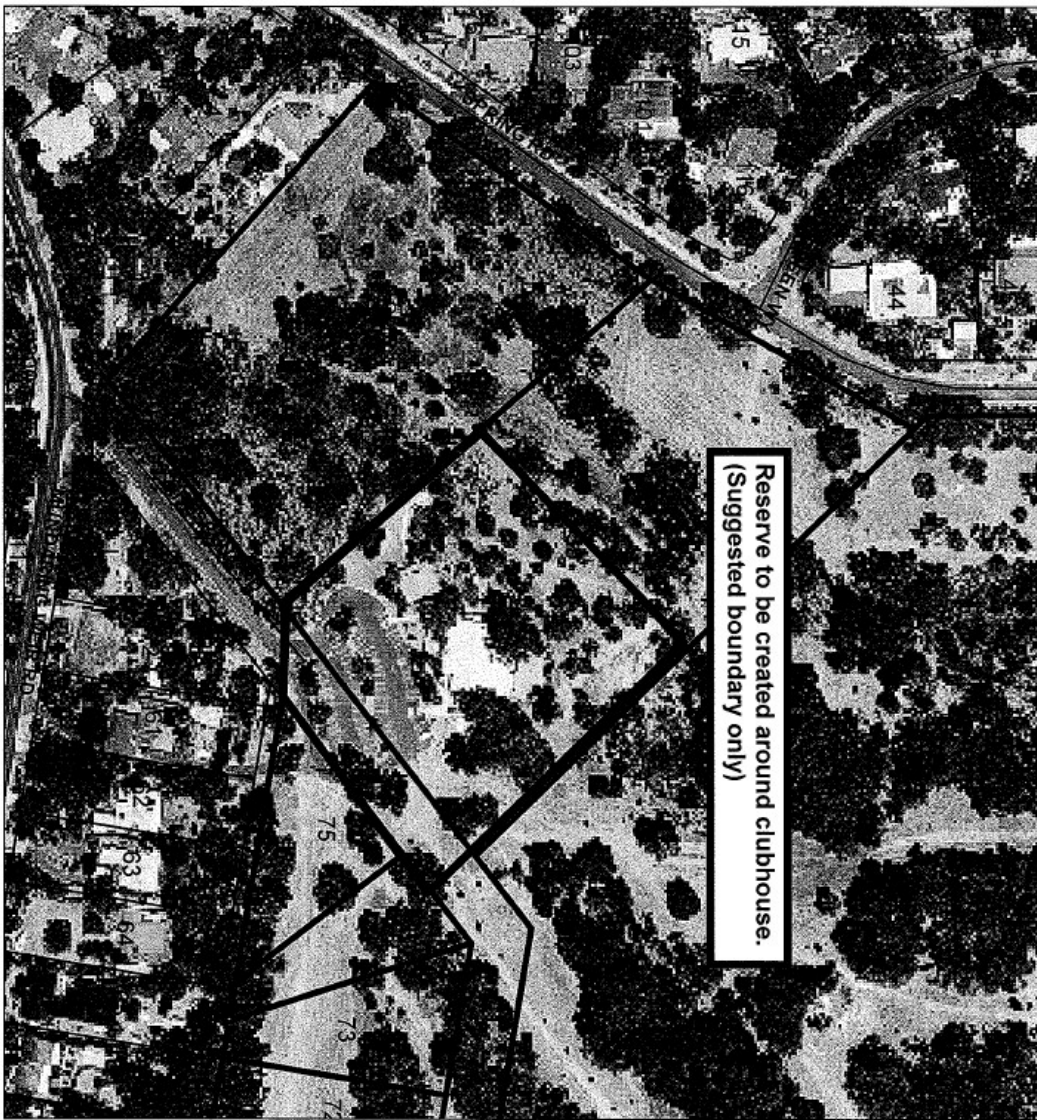
Yours sincerely



Ryan Zaknich  
For Manager  
WAPC - Property Management Services

July 13, 2007

CC. Shire of Kalamunda



**Reserve to be created around clubhouse.  
(Suggested boundary only)**



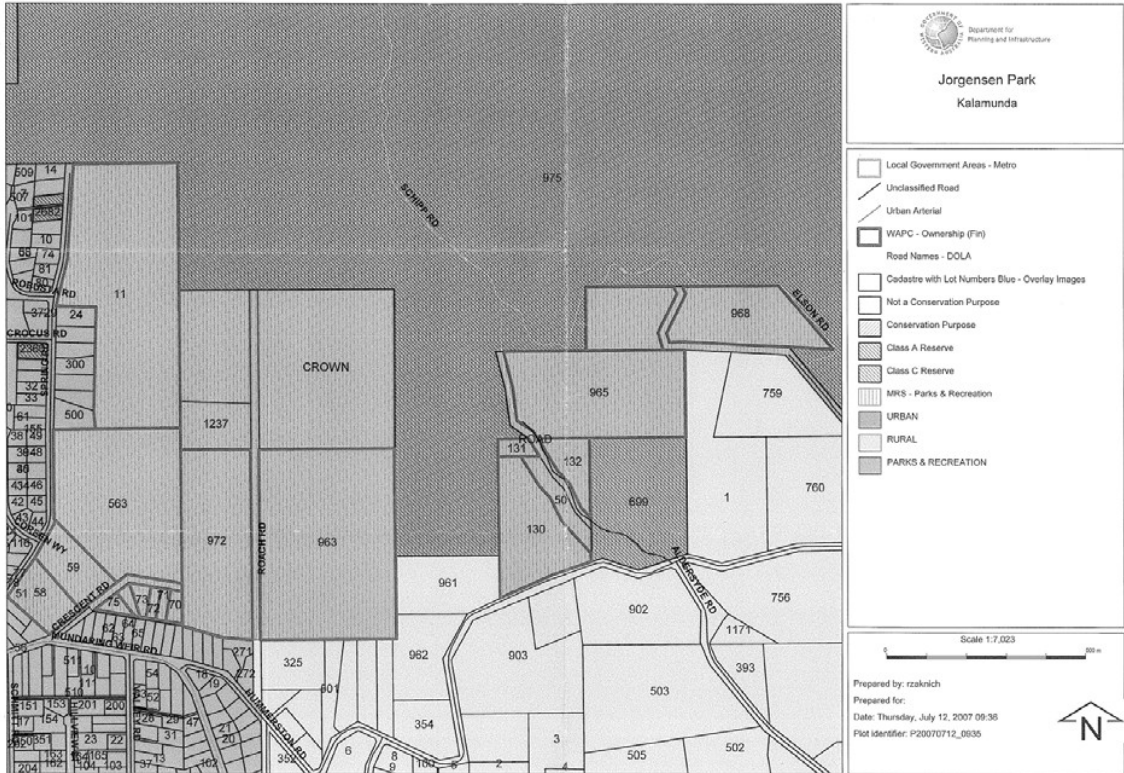
Jorgensen Park

- Local Government Areas - Metro
- Unclassified Road
- Urban Aerial
- W/ALP - Ownership (FM)
- Road Names - DDLA
- Cadastre with Lot Numbers Blue - Overlay Images
- 2006 Metro/Pael (Ht Ras)

Scale 1:1 983  
0 50 m



Prepared by: rzanich  
Prepared for:  
Date: Thursday, July 12, 2007 08:49  
Plot Identifier: P20070712\_0948



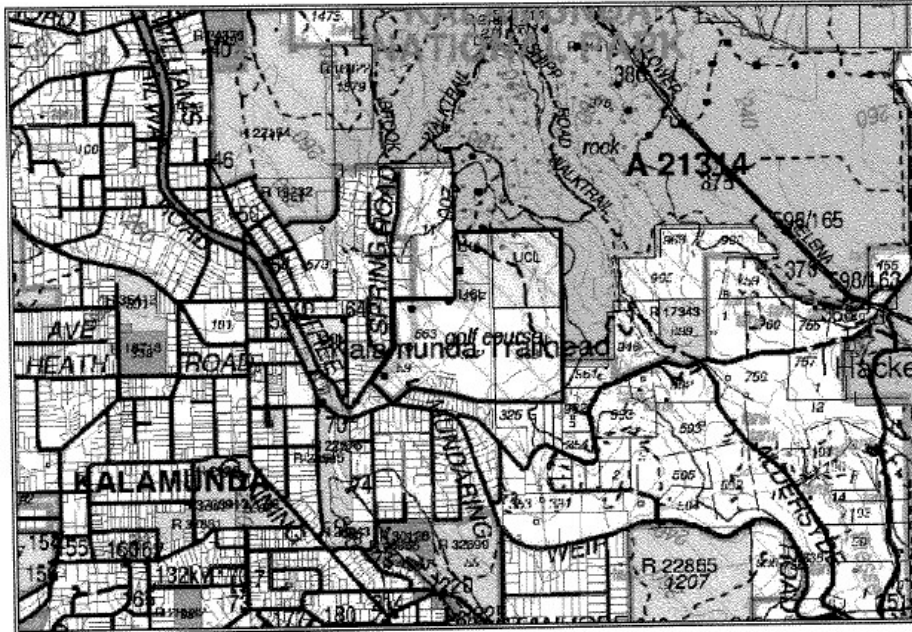
***Phytophthora cinnamomi* – Assessment  
Results – Jorgenson Reserve, Shire of  
Kalamunda**

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## 1.0 Executive Summary

Glevan Consulting undertook the assessment for the presence of the disease caused by *Phytophthora cinnamomi* in areas of remnant bushland within the Jorgenson Park Reserve. The fieldwork was conducted by Evan Brown and Gavin Clapperton of Glevan Consulting. Both Mr Brown and Mr Clapperton are accredited by the Department of Conservation and Land Management (CALM) in the detection, diagnosis and mapping of the disease caused by *P. cinnamomi*.



The majority of the Park (assessed area shown within the blue boundary on the above image) covers the disused Kalamunda Golf Course, with the old fairways still devoid of vegetation and used as walking trails. An area to the east of the old golf course was also assessed, this area also adjoining the Kalamunda National Park section of the Darling Range Regional Park.

The disease caused by *Phytophthora cinnamomi* appears to have spread through the vast majority of the vegetation within Jorgenson Park.

This was not unexpected as:

- ▶ The vegetation was cleared over fifty years ago in the construction of the golf course, the possible introduction of the disease into the site.
- ▶ In the maintenance of the golf course, the watering of fairways and greens during summer periods would create the conditions required for the sporulation and subsequent spread of the disease. (Warm moist soil).

Nine soil and tissue samples were taken in the assessment process to confirm the presence of the disease. These samples were processed by the Department of Conservation and Land Management Vegetation Health Service using standard and recognised laboratory techniques. Seven of the samples proved the presence of *P. cinnamomi* at the site.

## 2.0 Introduction to *Phytophthora cinnamomi* (Dieback)

*Phytophthora cinnamomi* is an introduced soil-borne pathogen (water mould) that kills a wide selection of plant species of the south west of Western Australia. Despite being a water mould, taxonomists advise that *Phytophthora* species be referred to as fungi.

The pathogen almost certainly entered Western Australia shortly after the European colonization and has since produced a complex mosaic of infested and uninfested areas in the southwest.

The spread of the pathogen accelerated after World War II with the use of heavy machinery being used for road building and logging activities and unknowingly spreading infected soil.

The life cycle of *P. cinnamomi* depends on moist conditions that favour the survival, sporulation and dispersal of the spores.

The pathogen is not capable of photosynthesis. Because it needs to extract food from living plant tissue, it does this via a mass of microscopic threadlike mycelium that forms the body of the organism that grows through host tissue. The mycelia continue to grow within the host tissue when the ambient moisture content is above 80%. The mycelia may be transported in soil and host tissue and then deposited where it may infect new hosts. The mycelium, given warm, moist conditions are capable of producing the millions of tiny spores that reproduce the pathogen. Two kinds of spores are likely to be found.

### Zoospores

Zoospores are very small spores that can actively swim very short distances towards new hosts and initiate new infections. They are short-lived and fragile but produced in large numbers, and are the mode for the spread of the disease from one plant to the next. They can also be carried along in moving water over large distances. As they move through the soil zoospores lodge on plant roots, infect them, and in susceptible plants produce mycelia. The mycelium grows, feeding on the host, rotting the roots and cutting off the plant's water supply. The mycelium may grow from plant to plant via root-to-root contact points and/or root grafts.

### Chlamydo-spore

Chlamydo-spores are larger spores that are tough and long-lived (within dead plants and the soil). They are produced under unfavourable conditions and are the resistant resting phase of the pathogen. They may be transported in soil or roots and then germinate to cause a new infection when they encounter favourable conditions. The chlamydo-spores produce mycelium and zoospores.

When conditions are warm and moist, microscopic spore sacks called sporangia and thick walled chlamydo-spores are produced vegetatively from mycelia strands that form the body of the pathogen in the soil or host tissue. The sporangia release motile zoospores in free water to infect host roots. Mycelia of different mating types may grow together inducing the production of thick walled sexual spores called oospores. The mating types are called A1 or A2. Only one mating type (A1) occurs in WA.

Currently the pathogen cannot reproduce sexually in WA and relies on vegetative reproduction for survival and dispersal.

After infection, the pathogen invades root bark and forms lesions that may extend in to the plants stem collar. In susceptible species, the infection of roots and collar will result in the death of the host.

Once dispersed, the spores may infect a wide range of resistant and susceptible hosts.

*P. cinnamomi* has a very wide host range. At least 1000 species from taxonomically diverse families have been reported as hosts for *P. cinnamomi* of which nearly half have been recorded from research in Australia. Indigenous species most affected belong to four families:

- Proteaceae
- Epacridaceae
- Papilionaceae/Fabaceae

• Myrtaceae

Not all genera within a family or all species within a genus are necessarily susceptible. E.g. some species of *Eucalyptus* are highly resistant (including Karri, Marri, Wandoo and Tuart) while some, such as Jarrah, are affected but have the ability to resist the invasion of the pathogen under certain conditions (Tissue moisture content < 80%).

Broad estimates are that perhaps 1500 to 2000 species of the estimated 8000 species of vascular plants in the South West of WA may be susceptible to the degree that successful infections result in the death of the host.

For any *Phytophthora* species to survive, it requires a combination of the pathogen, host and suitable environmental conditions.

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 *P. cinnamomi*.

Infertile soils are more compatible to *P. 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. Native vegetation that has adapted to the infertile soils by having a large surface area of root matter place these species at a significant risk of infestation.

Clay and laterite, significant components of some soil types of the southwest act as impeding layers and causes subsurface ponding, which 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 *P. cinnamomi* is less extensive and confined to water-gaining sites in the landscape.

### 3.0 Glossary of common words.

<b>Disease</b>	a combination of a pathogen, host and correct environmental conditions, which results in disease symptoms or death of a host.
<b>Host</b>	the plant which is invaded by a pathogen and from which the pathogen derives its energy
<b>Infested areas</b>	areas that accredited personnel have determined have plant disease symptoms consistent with the presence of the pathogen <i>P. cinnamomi</i> .
<b>Pathogen</b>	any organism or factor causing disease within a host.
<b>Protectable area</b>	areas, including areas of high conservation and/or socio-economic value (E.g. a small uninfested area which contain a known population of a susceptible species of threatened flora) within the vulnerable zone that: <ul style="list-style-type: none"><li>• Are situated in zones receiving &gt; 600 mm per annum rainfall or are water gaining sites (E.g. granite outcrops, impeded drainage or engineering works which aggregate rainfall) in the 400-600 mm per annum rainfall zone</li><li>• Do not have a calcareous soil (e.g. not a Quindalup dune system)</li><li>• Have been determined to be free of the pathogen <i>P. cinnamomi</i> by a qualified Disease Interpreter (all susceptible indicator plant species are healthy, no plant disease symptoms normally attributed to <i>P. cinnamomi</i> are evident)</li></ul>

- Are positioned in the landscape and are of sufficient size. (E.g. > 4 ha with axis > 100m) such that a qualified Interpreter judges that the pathogen will not autonomously engulf them in the short term (a period of a few decades)
- Consists of areas where human vectors are controllable (E.g. not an open road, private property)

**Susceptible** influenced or harmed by *P. cinnamomi*.

**Uninfested areas** areas that an accredited person has determined to be free of plant disease symptoms that indicate the presence of the pathogen *P. cinnamomi*.

**Uninterpretable areas** areas situated in areas receiving > 600+ mm per annum rainfall or are water gaining sites (eg. granite outcrops, impeded drainage or engineering works which aggregate rainfall) in the 400-600mm per annum rainfall zone where indicator plants are absent or too few to determine the presence or absence of disease caused by *P. cinnamomi*. (CALM - *Phytophthora cinnamomi* and the disease caused by it)

#### 4.0 Management of the disease

The management of *P. cinnamomi* can be described in four parts, PATHOGEN, PROCESSES, PEOPLE and PERFORMANCE.

##### 4.1 Pathogen.

###### Are *Phytophthora* species present in the vegetation? How do you know?

The assessment of the vegetation in Jorgenson Park was conducted by Evan Brown and Gavin Clapperton of Glevan Consulting.

To determine if the disease caused by *P. cinnamomi* is present at a site, an assessment is made of any site where there exist deaths in plant species that are susceptible to the disease. By these visual indications, the site can be interpreted to determine if the deaths form a recognised pattern of movement of the disease. In the sites infested with Dieback, the deaths are generally fresher on the extremities of the infestation. This age range of deaths shows the rate and direction of the spread.

The field assessment was also supported by the laboratory analysis of soil and plant tissue samples.

During this assessment, nine soil and tissue samples were taken at suspicious sites throughout the Park. These samples were analysed by Vegetation Health Service, (Department of Conservation and Land Management) utilising the standard laboratory techniques.

The effect of *P. cinnamomi* upon the health of plant communities, and upon the species in them, varies greatly. This variability is caused by the considerable inconsistency that exists within and between native plant species in their responses to the presence of *P. cinnamomi*, and various environmental factors.

In many places, it destroys the structure of many native communities, reduces their floristic diversity, decimates their primary productivity and destroys habitat for much dependant native fauna, particularly its value as protection against feral predators. In some places the pathogen causes little damage at all.

The assessment for the presence or absence of *Phytophthora* sp. at all sites in the study is determined with consideration of the following:

- ▶ The presence of *Phytophthora* can only be deduced from the death of susceptible plants.
- ▶ A single death may be caused by *Phytophthora*. A more confident assessment may be made if more dead plants are seen and/or if the plants are of a differing species. A note is also made of any progression in the deaths (a range in the age of deaths) or the evidence of vehicle tracks nearby (or other potential vectors).

- ▶ The presence of *Phytophthora* can sometimes be determined by laboratory analysis. A negative result indicates that the *Phytophthora* was not recovered from the sample supplied, not that *Phytophthora* was not present at the sample site. An analysis of the site should always be conducted with the laboratory result and field experience.
- ▶ It is difficult to detect the presence of *Phytophthora* in areas that have been recently burnt or where there are too few indicator species present.
- ▶ Areas that have had recent disturbance may harbour cryptic infections. The time taken for any new infection to express as a disease may vary from six months to many years depending on environmental conditions.
- ▶ Many other agents may be responsible for a plant death, eg drought, frost, other pathogens, insects and mechanical activity.

When a sample of a site was required, the following procedure was performed:

- ▶ The mattock (and all digging implements) were thoroughly sterilized prior to use with methylated spirits. The implements were then allowed to dry so that the integrity of the sample was not compromised.
- ▶ The area around the base of the plant/s to be sampled was cleared of vegetative matter to aid the digging process.
- ▶ The plant was dug to a satisfactory depth so that the tissue with the highest moisture content was obtained.
- ▶ Sections of the roots and stem base from all sides of the plant were taken and placed in a plastic bag. If any lesion was noticed on the tissue, it was also placed in the bag. A few handfuls of sand from various depths were also deposited in the plastic bag.
- ▶ The sample bags were irrigated with distilled water to try and simulate the optimum conditions for the *Phytophthora* to survive.
- ▶ Details, such as the date, sample number and interpreters were written on an aluminium tag, which was left at the site. The tag was demarcated with a strip of day-glow orange flagging tape.
- ▶ The mattock and any other digging implement used were sterilized after each sample to ensure that infected soil was not transported to the next sample site.

#### 4.2 Processes

Are there processes in place to ensure that the risk of spreading the pathogen is minimised throughout all operations?

Detailed processes should be enacted to manage the impact and non-autonomous spread of the disease caused by *Phytophthora*. Each specific operation may have a distinct set of procedures, however there are some overarching processes, such as:

- ▶ Ensuring that the active disease edge has been recently mapped and demarcated in the field.
- ▶ Strategic placement of vehicle clean-down points.
- ▶ Controlling unauthorised access.

#### 4.3 People

Who owns the process? Who is responsible for ensuring the processes are followed?

Everybody plays a role in ensuring that the spread and subsequent impact of the disease is minimised. All personnel involved in any activity within the land management area should be informed as to the risk of their activity spreading the disease caused by *Phytophthora*.

Factors to consider should be:

- ▶ Do all personnel understand and comply with hygiene procedures? Is training required?
- ▶ Are all contractor vehicles clean prior to their entry to the site?

#### 4.4 Performance

##### Are the processes working? How do you know? Can they be improved?

The procedures will offer strategies to reduce the spread of the disease. These strategies should offer indicators to measure the success of the procedures. These performance measures could include:

- ▶ The number of new diseased areas.
- ▶ Known breaches of hygiene regulations.
- ▶ The increased size of the diseased areas caused by external influences.

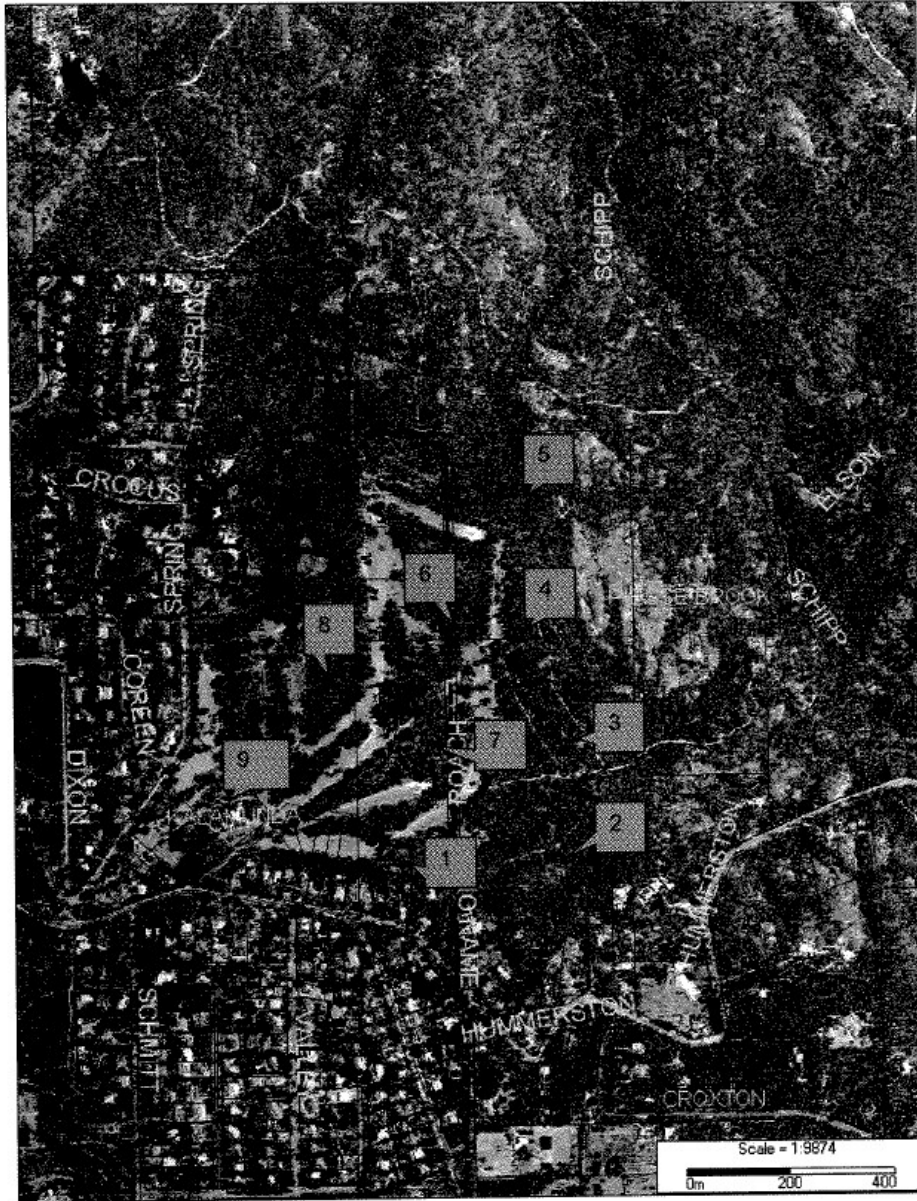
#### 5.0 Results

The disease appears to have been at the site for some time, with the majority of the vegetation surrounding the fairways being modified by the disease during time. Few deaths in susceptible species were seen in the vegetation in these areas, however the disease was very evident at points that are higher in the landscape, the points at which the disease is still progressing through the vegetation. At these points, there are many deaths in the susceptible species present, including the *Banksia grandis* and *Xanthorrhoea gracilis*.

The locations of the nine soil and tissue samples are shown on the image below. The samples that returned a result that was positive to the presence of the dieback disease are shown in red, while two samples (Sample 5 and 6) did not prove the presence of the disease. As discussed in Section 4.1, a negative sample result does not mean that the disease is not present at the site, but a determination can be made based on the surrounding vegetation. Previous studies (Dr Elaine Davison, Curtin University) have shown that positive sample results can be difficult to obtain in areas where the disease is 'inactive', such as areas where the disease has been present for a long period.

With the general nature of the land clearing, firebreaks and other tracks, the remaining vegetation is displaying a mosaic of infested and uninfested areas. With the extensive spread of the infested areas, it was not possible to find any areas of vegetation that could be considered protectable.

It is recommended that all vehicles used for rehabilitation or construction in the park are cleaned of soil and plant material prior to leaving the park, to mitigate the spread of the disease into surrounding areas.



## 6.0 References

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