

## HARTFIELD PARK BUSHLAND, FORRESTFIELD

**Boundary Definition:** protected area boundary (Areas of bushland within the boundaries of the Site are not accurately mapped. The boundary has been drawn to include any unmapped bushland.)

### SECTION 1: LOCATION INFORMATION

Bush Forever Site no. 320

Area (ha): bushland 73.6

Map no. 49

Map sheet series ref. no. 2033-I NE, 2034-II SE, 2133-IV NW, 2134-III SW

Other Names: Submission Area 242; Location 68 (Keighery, BJ, and Trudgen 1992)

Local Authorities (Suburb): Shire of Kalamunda (Forrestfield, Wattle Grove)

### SECTION 2: REGIONAL INFORMATION

#### LANDFORMS AND SOILS

##### Pinjarra Plain

Guildford Formation (Qpa: Mgs1) (Qha: Ms4)

##### Bassendean Dunes

Bassendean Sands (Qpb: S8)

##### Bassendean Dunes/Pinjarra Plain

Bassendean Sands over Guildford Formation (Qpb/Qpa: S10)

#### VEGETATION AND FLORA

##### Vegetation Complexes

###### Combinations of Bassendean Dunes/Pinjarra Plain

Southern River Complex

##### Floristic Community Types

###### Supergroup 2: Seasonal Wetlands

S2 Northern *Pericalymma ellipticum* dense low shrublands (most southern representation)

###### Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau

20a *Banksia attenuata* woodlands over species-rich dense shrublands (in area of most southern representation)

23a Central *Banksia attenuata* — *B. menziesii* woodlands

#### WETLANDS

**Wetland Types:** palusplain, creek, artificial channel

##### Natural Wetland Groups

###### Darling Plateau

Walyunga (D.1)

###### Bassendean—Pinjarra transition OR Bassendean with fluvial features

Mungala (B/P.2)

**Wetland Management Objectives:** Conservation (68.4ha), Resource Enhancement, Multiple Use

**Swan Coastal Plain Lakes EPP:** none identified

#### THREATENED ECOLOGICAL COMMUNITIES

Not assessed, Not determined, Endangered (floristic community type 20a)

### SECTION 3: SPECIFIC SITE DETAIL

**Landscape Features:** vegetated wetland, vegetated uplands

**Vegetation and Flora:** limited survey (DEP 1996 (Hart 01–04), Keighery, BJ, and Trudgen 1992, Shire of Kalamunda 1996)

**Structural Units:** mapping (Keighery, BJ, and Trudgen 1992, Shire of Kalamunda 1996)

Uplands: *Eucalyptus calophylla* and *E. marginata* Low Forest; *Eucalyptus calophylla* Low Woodland; Low Woodlands dominated by *Eucalyptus marginata*, *Banksia attenuata*, *B. menziesii* and *Allocasuarina fraseriana* and combinations of these; *Banksia attenuata* and *B. menziesii* Low Woodland

Wetlands: *Eucalyptus rudis* and *E. calophylla* Low Woodland; *Melaleuca preissiana* Open Low Woodland; Closed to Open Low Heath dominated by *Hypocalymma angustifolium*, *Pericalymma ellipticum*, *Hakea sulcata* and combinations of these with scattered clumps of *Actinostrobos pyramidalis* and *Beaufortia squarrosa*; scattered clumps of *Melaleuca viminea* over *Meeboldinia coangustatus* Closed Sedgeland

**Vegetation Condition:** >75% Excellent to Very Good, <25% Good to Degraded, with areas of severe localised disturbance (Shire of Kalamunda 1996)

**Total Flora:** 119 native taxa, 8 weeds (plot-generated list only) (DEP 1996)

**Significant Flora:** *Conospermum undulatum* (R); *Isopogon drummondii* (3), *Lambertia multiflora* var. *darlingensis* (3), *Stachystemon axillaris* (4), *Verticordia lindleyi* subsp. *lindleyi* (4); *Beaufortia squarrosa*, *Dasyopogon obliquifolius*, *Hakea conchifolia*, *Xanthorrhoea drummondii*

**Fauna:** structured survey for birds (25 species), native mammals (1 species), reptiles (11 species) and amphibians (3 species) (Harvey *et al.* 1997). Significant bird species: category 4 (3). Significant mammal species: Quenda (Friend 1996 D)

**Linkage:** adjacent bushland to the south (canopy across road to Site 387) and west; part of Greenways 101, 102, 98 (Tingay, Alan & Associates 1998a); part of a regionally significant fragmented bushland/wetland linkage (Part A, Map 7)

**Other Special Attributes:** recommended to be managed as a flora conservation (Keighery, BJ, and Trudgen 1992); Threatened or Poorly Reserved Plant Community (EPA 1994 GIS); majority Site Category One Area Middle Canning Catchment Study (Evangelisti & Associates *et al.* 1995); contains plant communities representative of the eastern side of the Swan Coastal Plain

#### **SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE**

Subject to protection under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*

#### **SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS**

**Criteria:** Representation of ecological communities, Diversity, Rarity, Scientific or evolutionary importance,

General criteria for the protection of wetland, streamline and estuarine fringing vegetation and coastal vegetation

**Recommendation:** Site with Some Existing Protection; the existing care, control and management intent of the reserve is endorsed. The purpose of the reserve should be amended to include conservation and appropriate mechanisms applied in consultation with the management body (see Table 3, Volume 1).

**HARTFIELD PARK BUSHLAND, FORRESTFIELD**

**Boundary Definition:** protected area boundary (Areas of bushland within the boundaries of the Bushplan Site are not accurately mapped. The boundary has been drawn to include any unmapped bushland.)

**SECTION 1: CADASTRAL INFORMATION**

(Lots, locations and derived information to be updated in the public submission period)

**Bushplan Site no.** 320    **Map no.** 58, 59, 63, 64    **Map sheet series ref. no.** 2033-I NE, 2034-II SE, 2133-IV NW, 2134-III SW

**Other Names**

Submission Area 242; Location 68 (Keighery, BJ, and Trudgen 1992)

**Local Authorities (Suburb)**

Shire of Kalamunda (Forrestfield, Wattle Grove)

**Ownership Categories**

Private (including commercial organisation), State Government

**Area (ha):** total 176.9; bushland 73.6

**Zoning**

**MRS:** Parks and Recreation, Controlled Access Highways

**TPS:** Landscape

**Lot/Location/Reserve numbers (Purpose),**

**Street name**

10 Hale Rd; 50, 51, 53 Welshpool Rd; 3894 Hartfield Rd; 3894 Bruce Rd

Crown Reserve

**SECTION 2: REGIONAL INFORMATION**

**LANDFORMS AND SOILS**

**Pinjarra Plain**

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**Vegetation Condition:** >75% Excellent to Very Good, <25% Good to Degraded, with areas of severe localised disturbance (Shire of Kalamunda 1996)

**Total Flora:** 119 native taxa, 8 weeds (plot-generated list only) (DEP 1996)

**Significant Flora:** *Conospermum undulatum* (R); *Isopogon drummondii* (3), *Lambertia multiflora* var. *darlingensis* (3), *Stachystemon axillaris* (4), *Verticordia lindleyi* subsp. *lindleyi* (4); *Beaufortia squarrosa*, *Dasyopogon obliquifolius*, *Hakea conchifolia*, *Xanthorrhoea drummondii*

**Fauna:** structured survey by Western Australian Museum of Natural Science (Harvey *et al.* 1997) for birds (25), native mammals (1), reptiles (11) and amphibians (3). Significant bird species: category 4 (3). Significant mammal species: Quenda (Friend 1996 D)

**Linkage:** adjacent bushland to the south (canopy across road to BS387) and west; part of proposed Greenways 115, 84, 116 (Tingay, Alan & Associates 1997a); part of a regionally significant fragmented bushland/wetland linkage (Volume 2A, Map 8)

**Other Special Attributes:** recommended to be managed as a flora conservation area (Keighery, BJ, and Trudgen 1992); Threatened or Poorly Reserved Plant Community (EPA 1994 GIS); majority Bushplan Site Category One Area Middle Canning Catchment Study (Evangelisti & Associates *et al.* 1995); contains plant communities representative of the eastern side of the Swan Coastal Plain

#### SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed

#### SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

**Criteria:** Representation of ecological communities, Diversity, Rarity, Scientific or evolutionary importance, General criteria for the protection of wetland, streamline and estuarine fringing and coastal vegetation

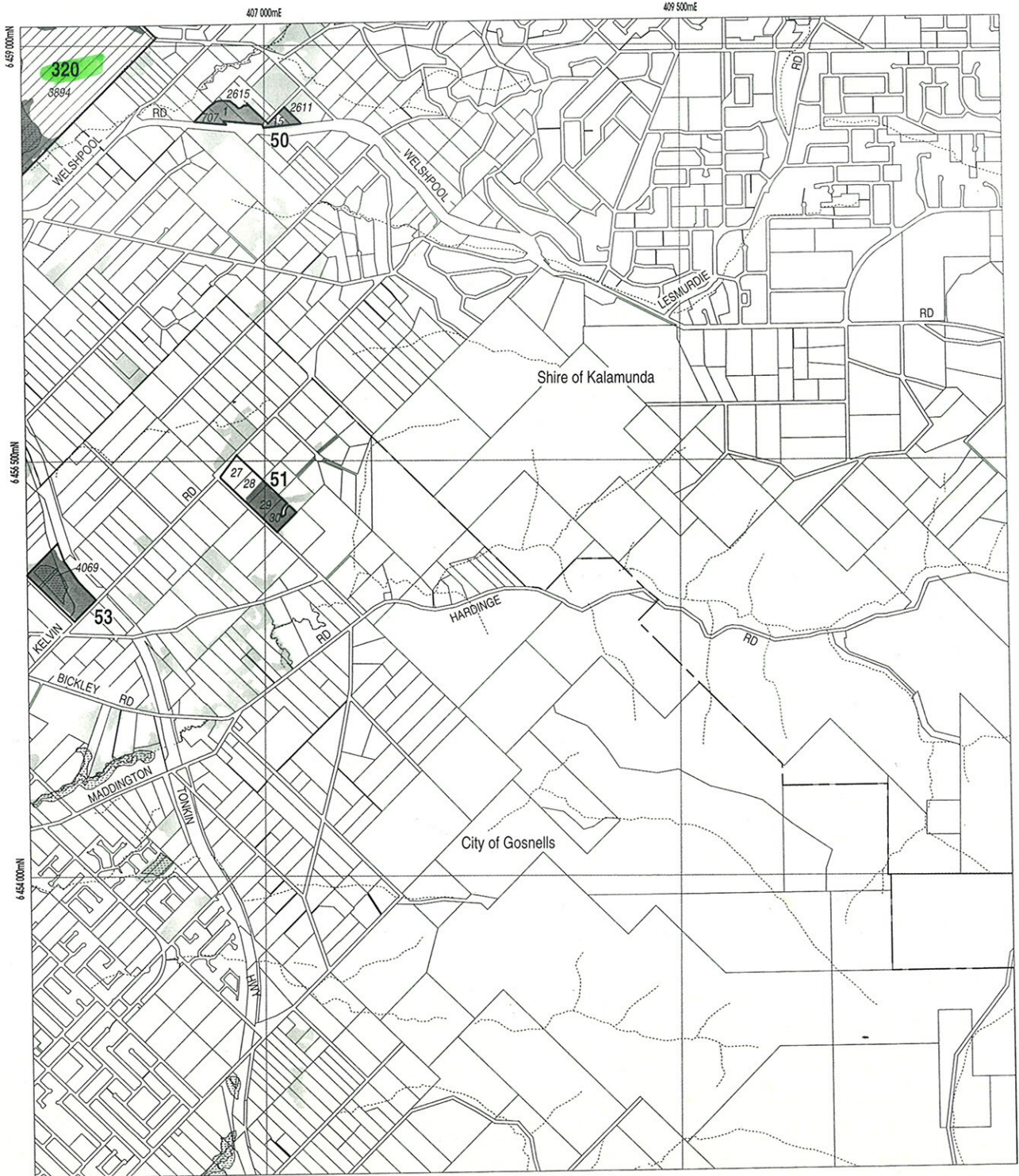
##### Opportunities and/or Constraints

Opportunities: Bushplan Site/part Bushplan Site subject to Swan and Canning Rivers EPP; location of Declared Rare Flora, conservation category wetlands; under MRS Parks and Recreation Reservation and TPS Landscape Zoning, Crown Reserve

Constraints: private land; under MRD regional road requirements

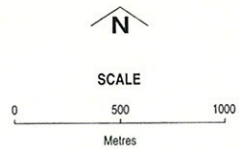
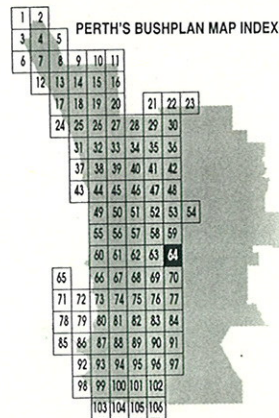
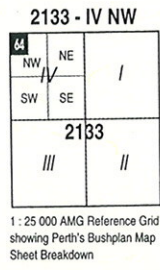
**Recommendation:** The existing care, control and management intent of the reserve is endorsed. Long-term security and support for conservation management of the Bushplan Site to be enhanced by: amending the purpose of the reserve to include conservation; and applying appropriate mechanisms in consultation with the reserve management body.



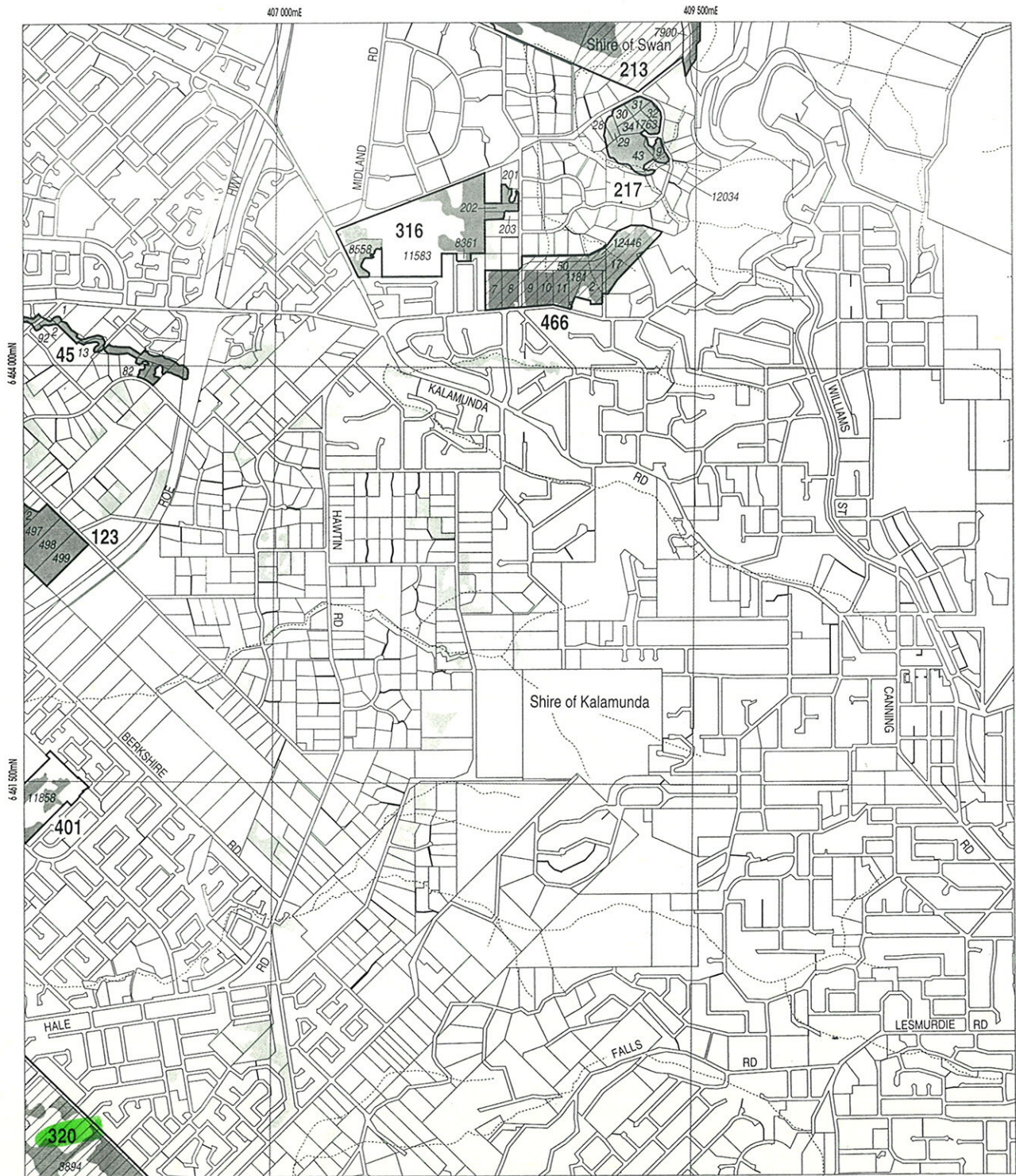


**LEGEND**

-  Bushplan Sites With Regionally Significant Bushland
-  Other Native Vegetation
-  Conservation Category Wetlands
-  Bushplan Sites With Some Existing Protection
-  Lot Number, Location Number
-  Channel Wetlands
-  Local Government Boundary

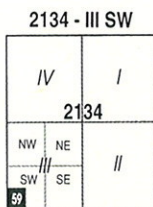


Produced by Project Mapping Section  
 Land Information Branch, Ministry for  
 Planning, Perth W.A. November 1998  
 ntw-map18/environ/bushplan/bushv2\_64.dgn  
 Cadastral Data supplied by Department  
 of Land Administration, W.A.  
 Wetlands Data supplied by  
 Water and Rivers Commission  
 Native Vegetation Extent for Study Area  
 supplied by Agriculture Western Australia



**LEGEND**

- 472** Bushplan Sites With Regionally Significant Bushland
- Other Native Vegetation
- Conservation Category Wetlands
- Bushplan Sites With Some Existing Protection
- Lot Number, Location Number
- Channel Wetlands
- Local Government Boundary

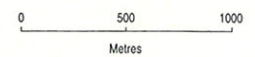


1 : 25 000 AMG Reference Grid showing Perth's Bushplan Map Sheet Breakdown

**PERTH'S BUSHPLAN MAP INDEX**

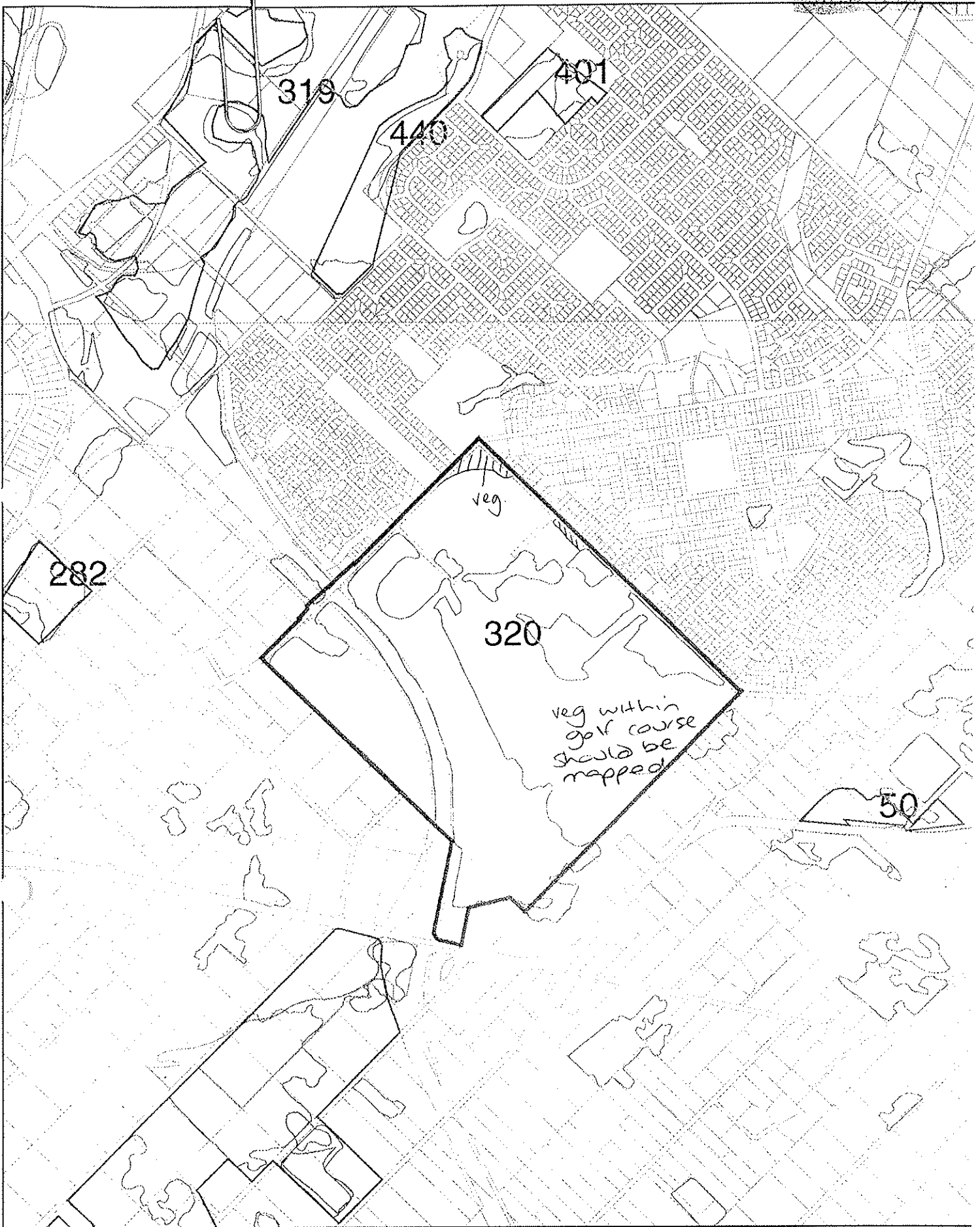


**SCALE**



Produced by Project Mapping Section  
 Land Information Branch, Ministry for  
 Planning, Perth W.A. November 1998  
 nwt-map11/enviro/bushplan/bushv2\_59.dgn  
 Cadastral Data supplied by Department  
 of Land Administration, W.A.  
 Wetlands Data supplied by  
 Water and Rivers Commission  
 Native Vegetation Extent for Study Area  
 supplied by Agriculture Western Australia





**BUSHPLAN SITES CORRECTED**

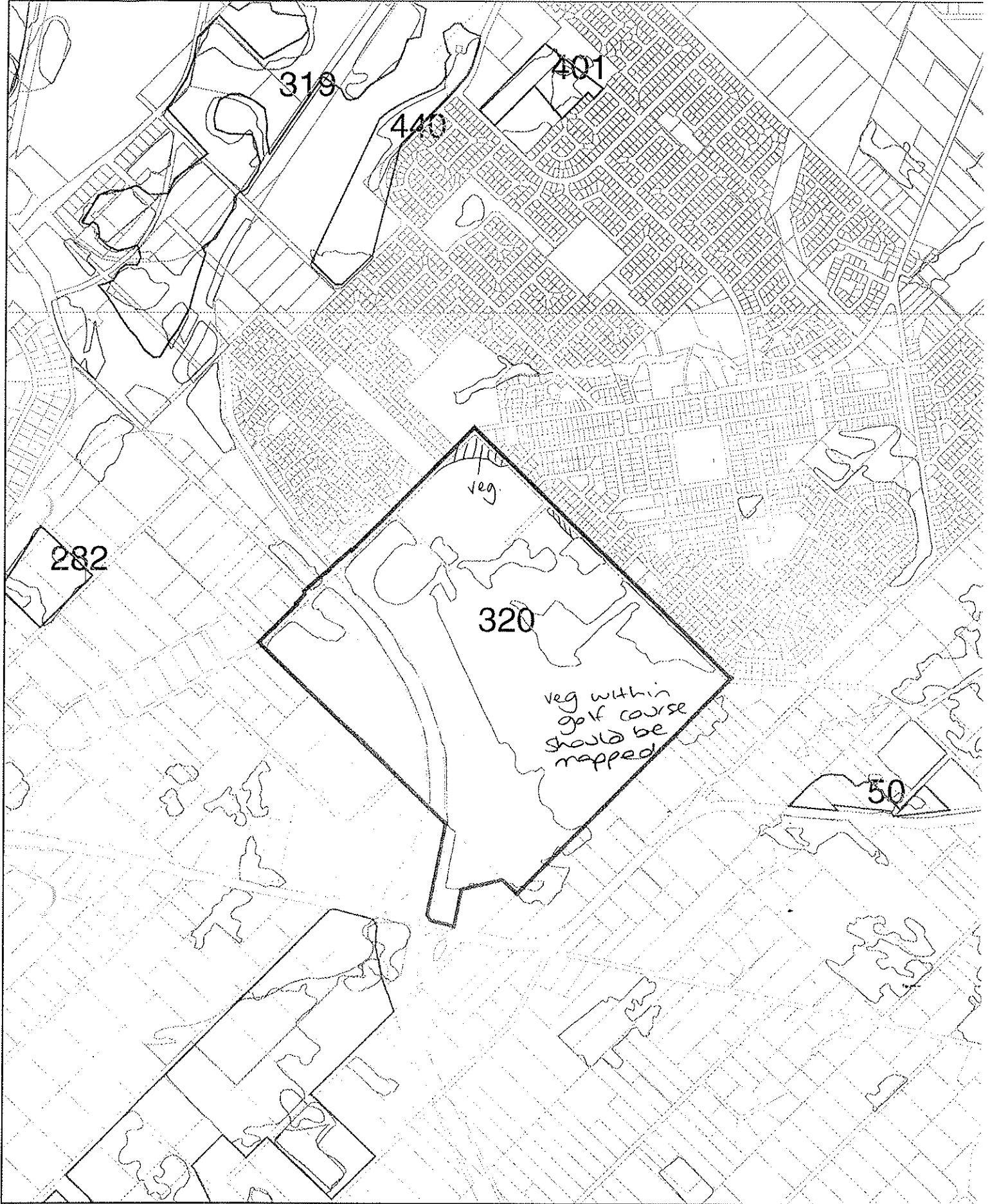


**WESTERN  
AUSTRALIAN  
PLANNING  
COMMISSION**



NT/JA 20/9  
OK except veg mapping B Bk2





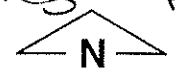
**BUSHPLAN SITES CORRECTED**



WESTERN  
AUSTRALIAN  
PLANNING  
COMMISSION








NT/JA 30/9  
OK except veg mapping





## bp site 320

-  AG VEG 1998 BOUNDARY THEME
-  Cadastre
-  Bushplan sites refno 1-500 SCP BOUNDARY THEME
-  cons category wetlands
-  Verified CCWs

MFP INTERNAL USE ONLY

Prepared By: Andrea Zappacosta

Prepared For:

Map Ident: plot980529\_1

Date: 29 May 98

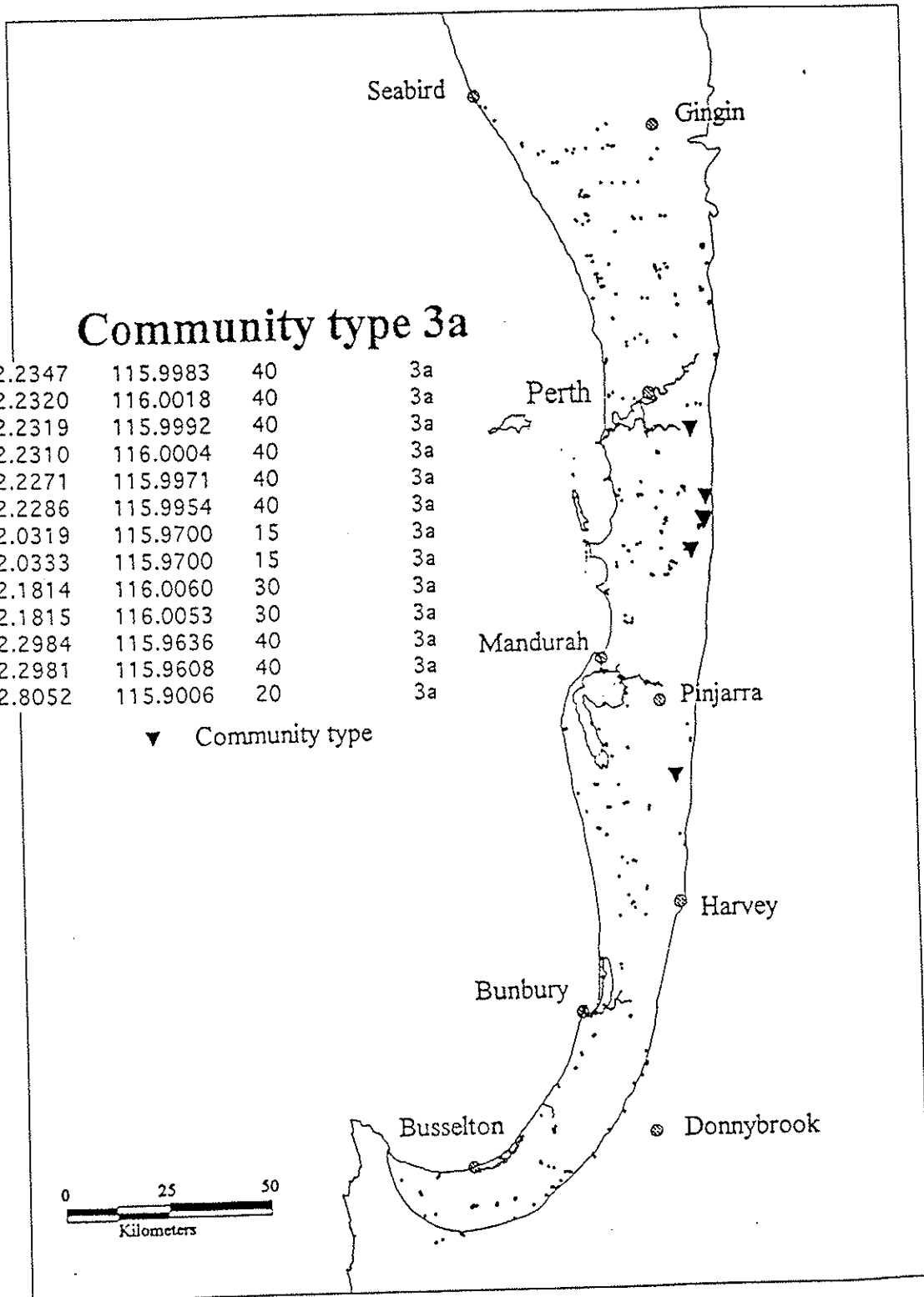
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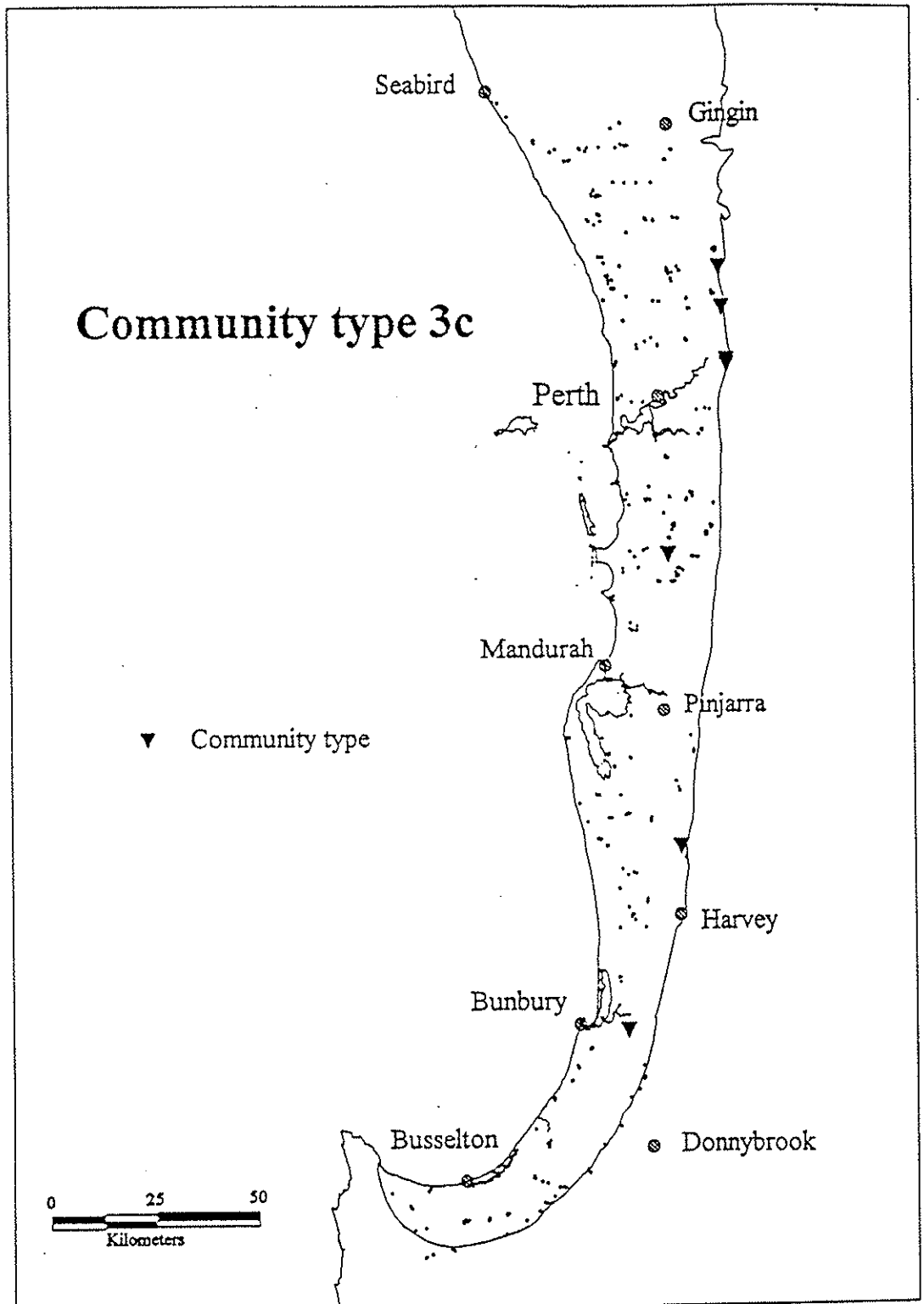
"Threatened  
 ecological communities"

CAM John Blyth

Community type 3a				
BRICK1	-32.2347	115.9983	40	3a
BRICK3	-32.2320	116.0018	40	3a
BRICK5	-32.2319	115.9992	40	3a
BRICK6	-32.2310	116.0004	40	3a
BRICK7	-32.2271	115.9971	40	3a
BRICK8	-32.2286	115.9954	40	3a
BRIX-2	-32.0319	115.9700	15	3a
BRIX-5	-32.0333	115.9700	15	3a
LAMB1	-32.1814	116.0060	30	3a
LAMB2	-32.1815	116.0053	30	3a
MUD-4	-32.2984	115.9636	40	3a
MUD-5	-32.2981	115.9608	40	3a
WARO06	-32.8052	115.9006	20	3a

▼ Community type



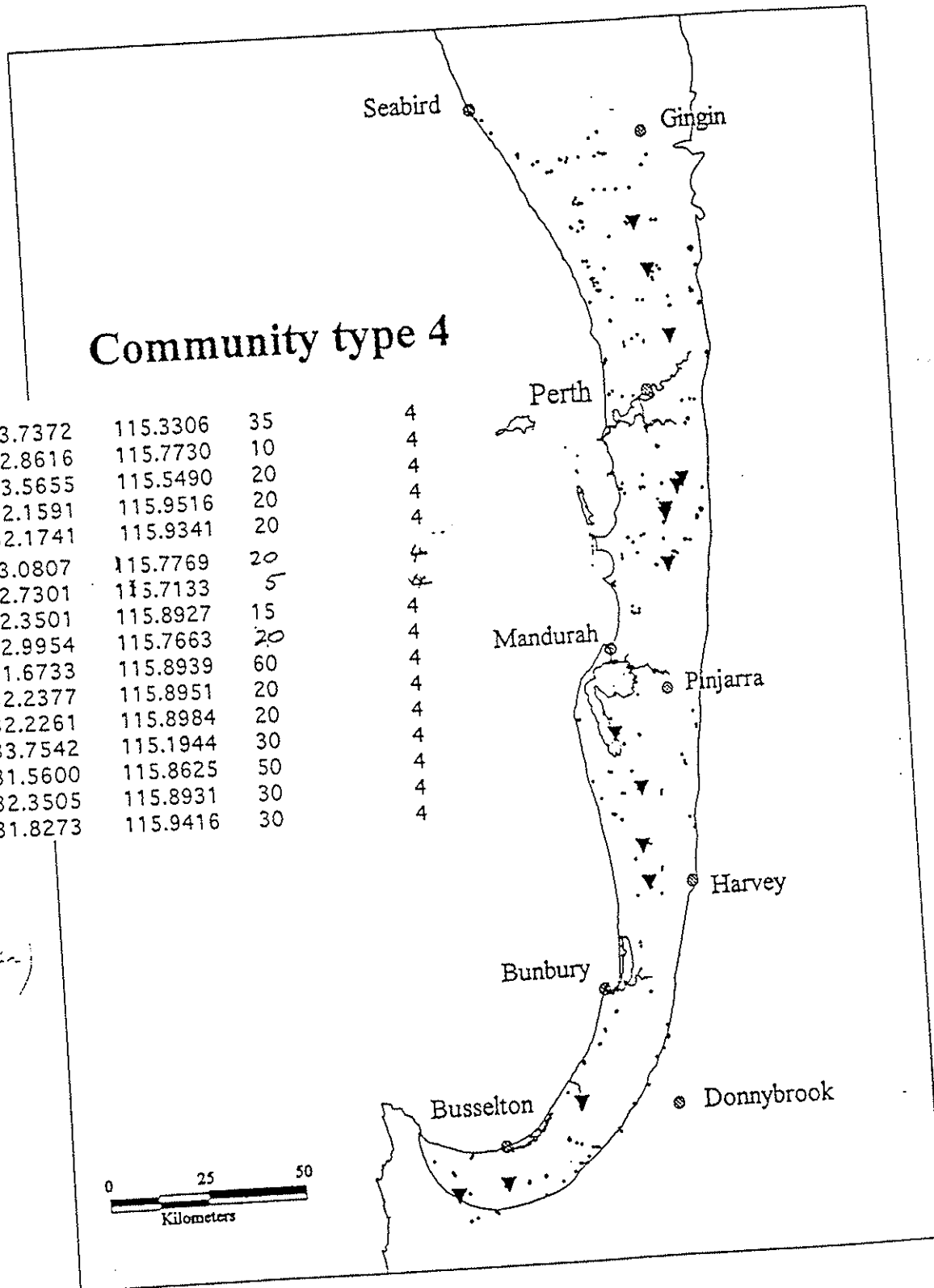


DUCK-1	-32.2917	115.8850	40	3c
DUCK-2	-32.2915	115.8841	40	3c
ELLEN-6	-31.7556	116.0350	20	3c
PEARCE-2	-31.6667	116.0294	20	3c
TALB1	-31.8733	116.0469	50	3c
TALB12	-31.8822	116.0464	50	3c
TALB13	-31.8819	116.0464	50	3c
TALB4	-31.8714	116.0469	50	3c
WATER-3	-33.3309	115.7590	20	3c
YARLO1	-32.9353	115.9048	35	3c

# Community type 4

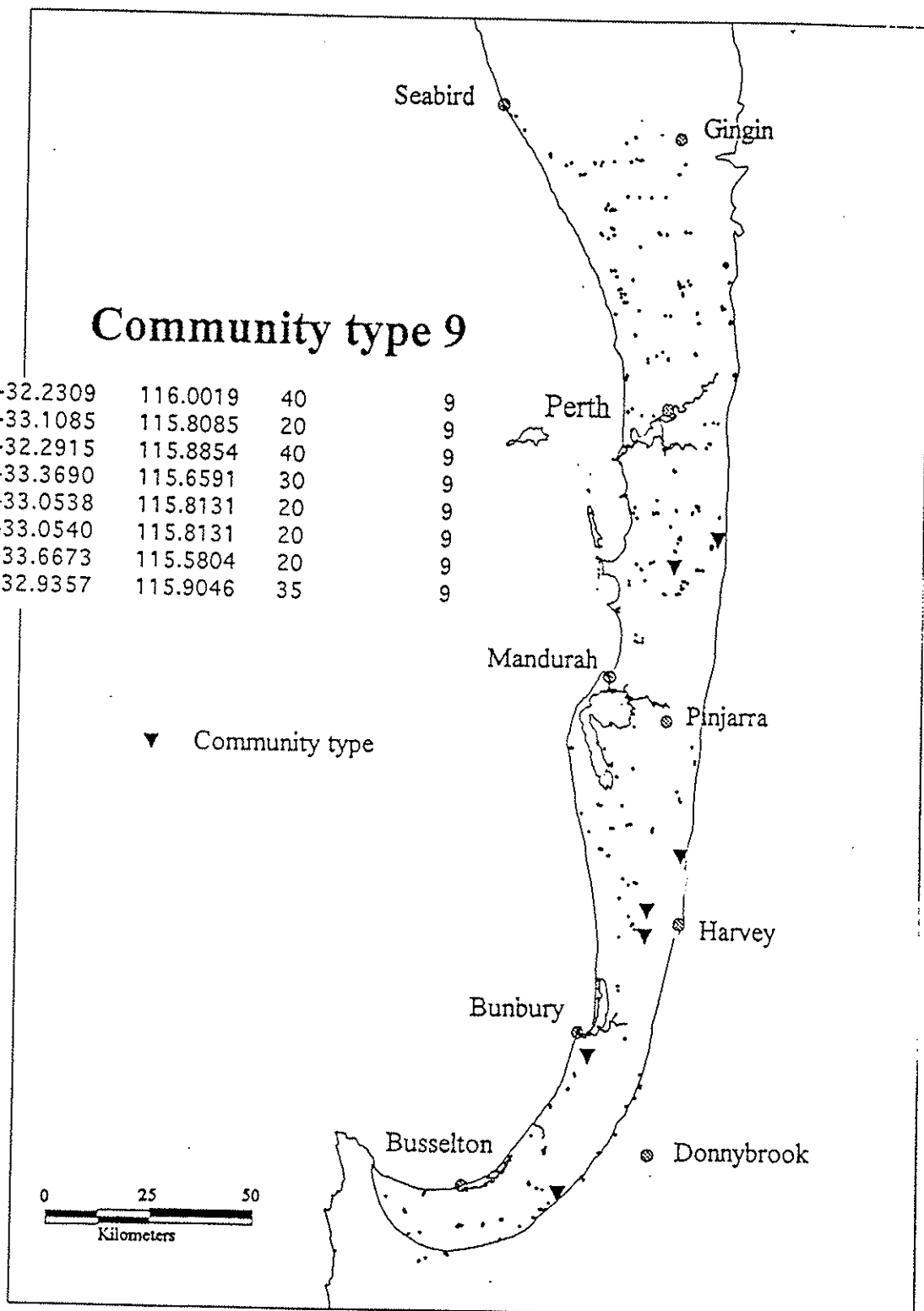
AMBR-3	-33.7372	115.3306	35	4
C58-1	-32.8616	115.7730	10	4
CAPEL-3	-33.5655	115.5490	20	4
FL-1	-32.1591	115.9516	20	4
FL-9	-32.1741	115.9341	20	4
GUTHR-1	-33.0807	115.7769	20	4
KOOLJ-1	-32.7301	115.7133	5	4
LOW14A	-32.3501	115.8927	15	4
LYONS-1	-32.9954	115.7663	20	4
MELA-1	-31.6733	115.8939	60	4
MODO-1	-32.2377	115.8951	20	4
MODO-6	-32.2261	115.8984	20	4
PAYNE-1	-33.7542	115.1944	30	4
PLINE-4	-31.5600	115.8625	50	4
ROWE02	-32.3505	115.8931	30	4
WHITE-2	-31.8273	115.9416	30	4

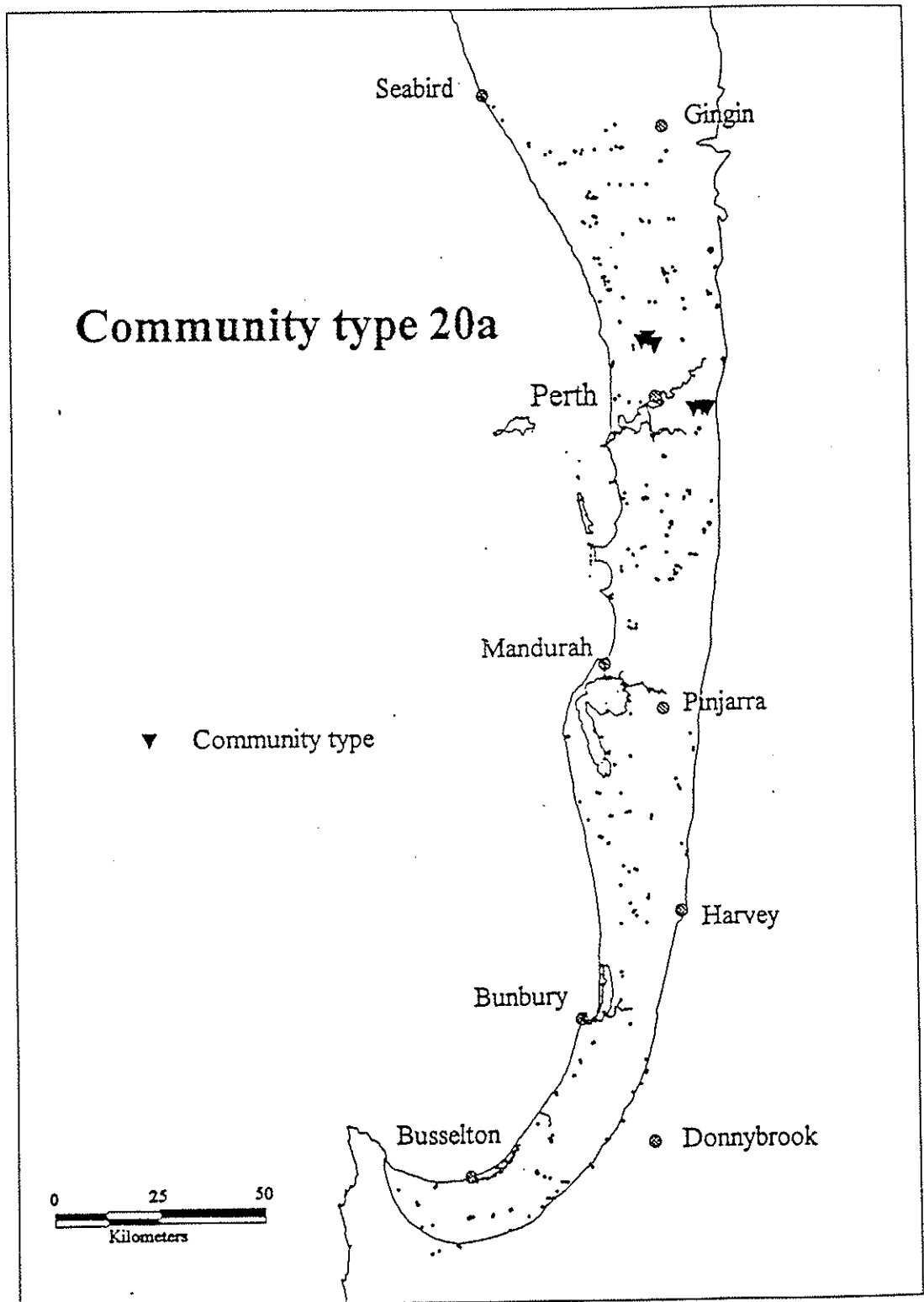
*Fuller (P)*  
*Crabtree (E. Gordon)*



## Community type 9

BRICK4	-32.2309	116.0019	40	9
BYRD-1	-33.1085	115.8085	20	9
DUCK-3	-32.2915	115.8854	40	9
MANEA-1	-33.3690	115.6591	30	9
WELRO1	-33.0538	115.8131	20	9
WELRO2	-33.0540	115.8131	20	9
WONN-3	-33.6673	115.5804	20	9
YARLO2	-32.9357	115.9046	35	9





APBF-1	-31.9794	116.0003	40	20a
APBF-2	-31.9806	115.9658	40	20a
GOLF-1	-31.8292	115.8347	60	20a
KOON-1	-31.8389	115.8675	70	20a
KOON-2	-31.8361	115.8681	60	20a
LAND-1	-31.8208	115.8503	60	20a
M53	-31.9775	115.9881	99	20a



Threatened plant comm. 20, 146  
x DRF

HARTFIELD PARK







## Bush Forever Site 320: Hartfield Park Bushland, Forrestfield

- Bush Forever Sites
- Local Government Authority Boundaries
- Lakes EPP
- Geomorphic Wetlands Feb04 by Evaluation
- Conservation
- Resource Enhancement
- Multiple Use

### Floristic Survey Sites of the Southern Swan Coastal Plain

- GJKENV (Keighery 1996)
- GRIFFIN (Griffen 1994)
- SCP (Gibson et al 1994)
- SYS6ENV (DEP 1996 and Trudgen & Keighery 1995)
- SYS6ENV2 (DEP 1996 and Trudgen & Keighery 1995)
- ⊛ CALM Threatened Ecological Communities 2002

▬ Roads - Perth Metropolitan

0 200 400 600 800 Meters



1:10000



Department of Environment

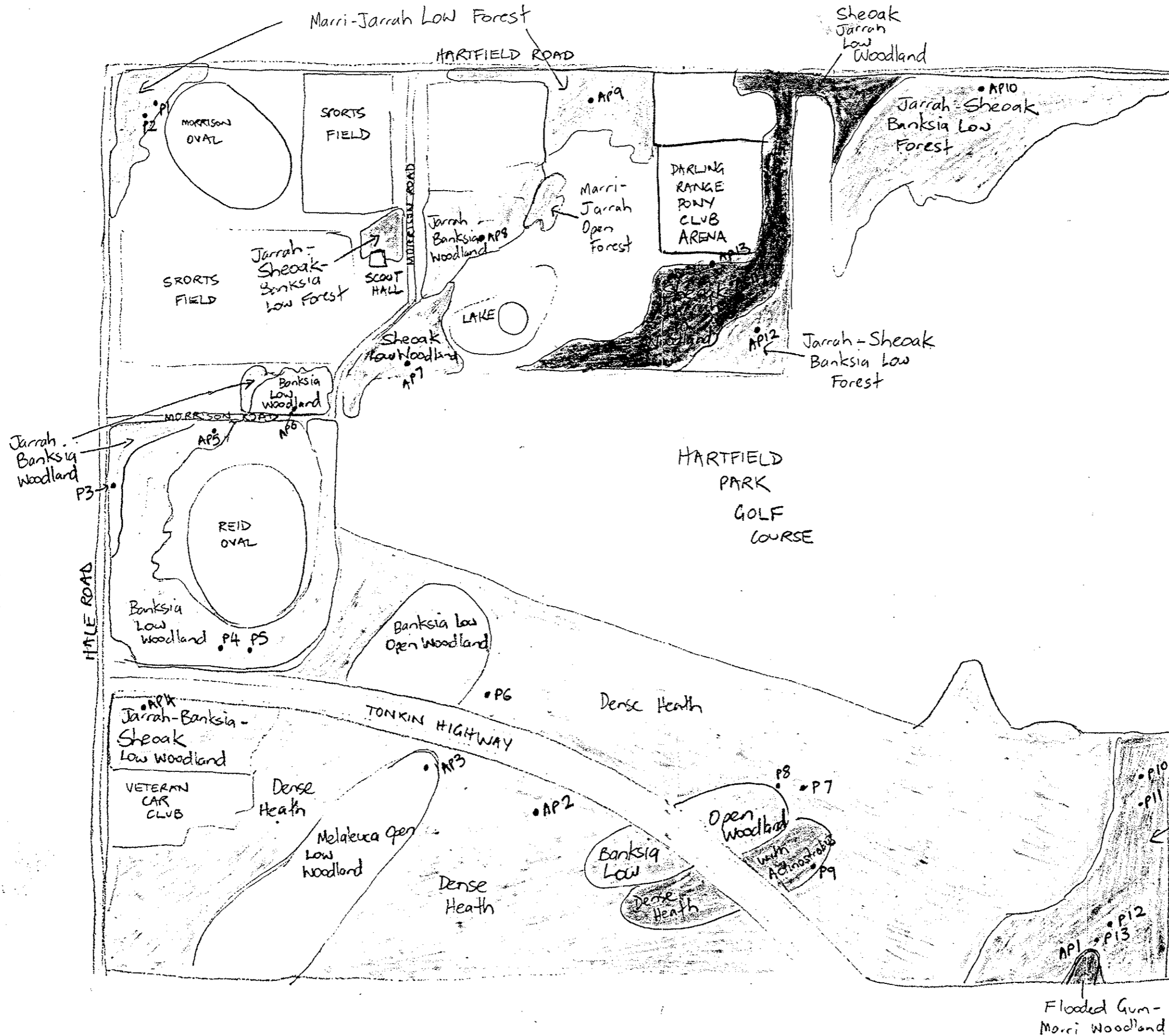
Data Sources:  
Cadastral DLI  
Aerial Photography : Skyview DLI

Datum: GDA - Projection: MGA Zone 50

# HARTFIELD PARK

## VEGETATION COMPLEXES

- Marri-Jarrah Low Forest
- Banksia Low Woodland
- Jarrah-Banksia Sheoak Low Woodland
- Jarrah-Banksia-Sheoak Low Forest
- Dense Heath
- Banksia Open Low Woodland
- Melaleuca Open Low Woodland
- Heath with Actinostrobus
- Jarrah-Banksia Woodland
- Marri Low Woodland
- Sheoak Low Woodland
- Sheoak-Jarrah Low Woodland
- Flooded Gum-Marri Low Woodland

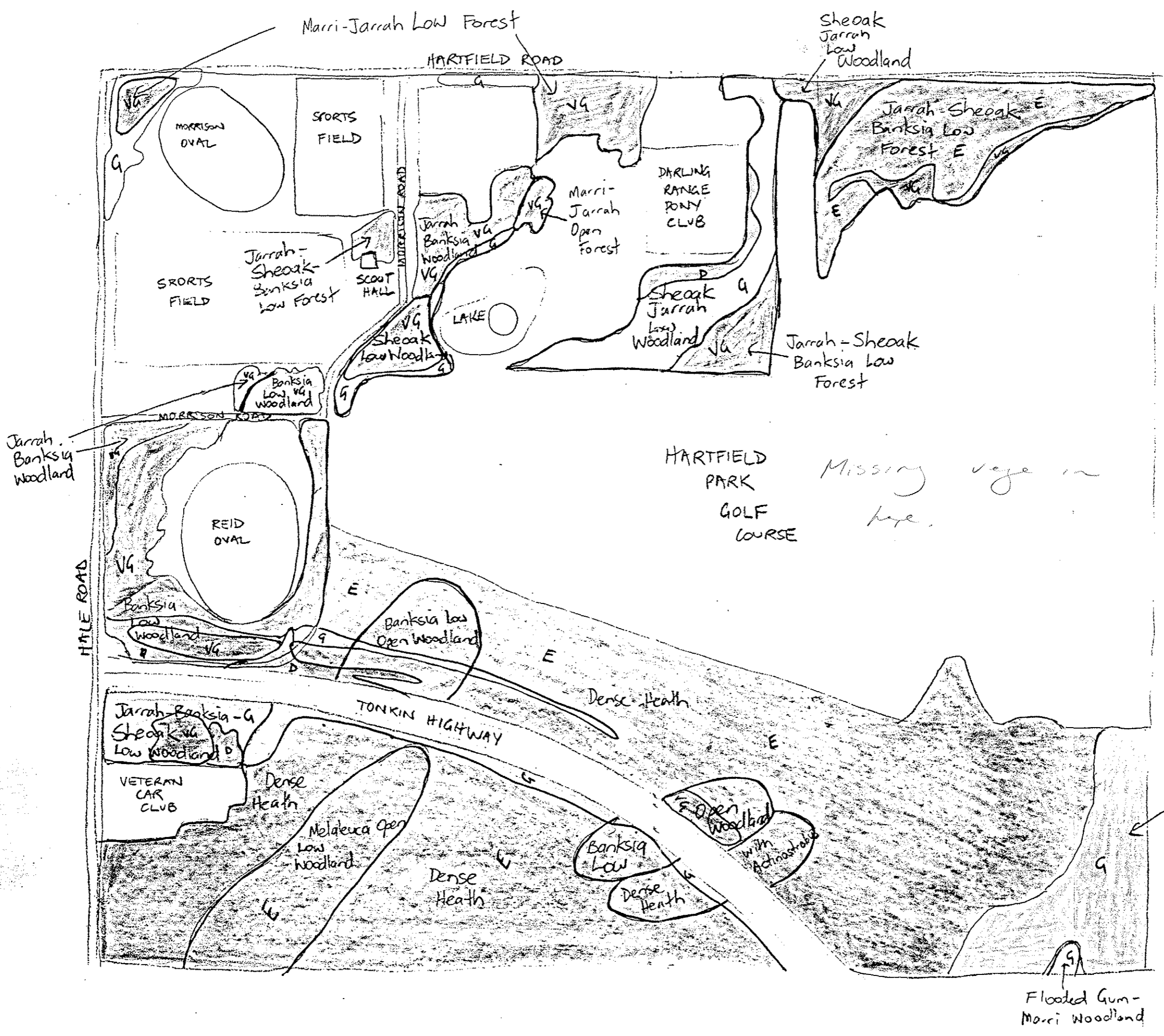


# HARTFIELD PARK

## VEGETATION COMPLEXES + CONDITION

-  Excellent
-  Very Good
-  Good
-  Degraded

Condition as described in Bushland Plant Survey (Keighery, 1994)



AREA INFORMATION

System 6 Area (C or M) or Update Area (Update) HARTFIELD

Conservation Area
Nature Reserve
Reserve No
National Park
Reserve No
Local Government
Reserve No
Other
Proposed Conservation Areas
Local Government Shire of Kalamunda
Reserve No 17098 (Recreation + Public Park)
Other

Conservation Area

Nature Reserve
Reserve No
National Park
Reserve No
Local Government
Reserve No
Other

TOTAL AREA

Bushland Area	85.187	hectares
Completely Degraded		

AREA MAPPED FLORISTIC UNITS

Units	Site (Condition)	Code	Bound	Area (ha)
	NO SITES			

Boundaries determined by use of

aerial photograph	Metro Regional Area run 14 5053 15/12/92 + 15
orthophoto	2034 11 SE Aug 1991
vegetation map	
soil map	

5240  
11/12/92

BUSHLAND AREA HARTFIELD PARK SITES YES/NO

DATE 29/9/95 RECORDERS \_\_\_\_\_

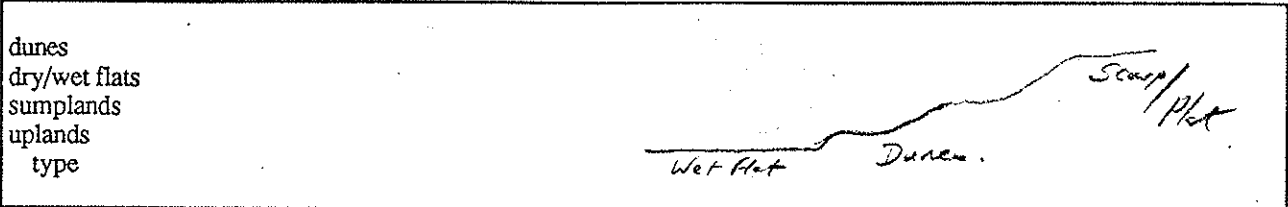
Observations / edge (transects)

Geographic Location Latitude \_\_\_\_\_ S Longitude \_\_\_\_\_ E

Reference Map \_\_\_\_\_

Photograph \_\_\_\_\_ Photographer's Name NT Photo No \_\_\_\_\_

Transect of landscape units



Soil type \_\_\_\_\_ Colour \_\_\_\_\_  
Exposed rock type \_\_\_\_\_ % area \_\_\_\_\_

VEGETATION

Eucalypts	<u>E. calophylla</u>	<u>E. wandoo</u>	<u>E. marginata</u>	<u>E. todtiana</u>	<u>E. rudis</u>
	<u>E. decipiens</u>	<u>E. drummondii</u>	<u>E. haematoxylon</u>	<u>E. lanepolei</u>	<u>E. gomphocephala</u>
	<u>E. accedens</u>	<u>E. patens</u>	<u>E. laeliae</u>	<u>E. megacarpa</u>	
Sheoaks	<u>Allocasuarina fraserana</u>		<u>Casuarina obesa</u>		
Banksia	<u>B. attenuata</u>	<u>B. menziesii</u>	<u>B. prionotes</u>	<u>B. illicifolia</u>	<u>B. grandis</u> <u>B. littoralis</u>
Melaleuca	<u>M. preissii</u>	<u>M. raphiophylla</u>	<u>M. lanceolata</u>	<u>M. cuticularis</u>	- W side long
Others	<u>Callitris preissii.</u>				
Mallees	Eucalypts	<u>E. argutifolia</u>	<u>E. petrensis</u>	<u>E. decurva</u>	<u>E. foecunda</u> <u>E. latens</u>

Sites 01 - 94  
Changes from Site 01 through to Banksia Woodland with similar understorey. None able to be sampled as all very disturbed floristics. tree but structure poor.

A07 BUSHLAND: See Hills/Hartfield/Britton connection

Vegetation Condition - Keighery 1994 (Trudgen 1993)

1 = 'Pristine' (Excellent)	
2 = Excellent (Very Good)	Much clearing see sites and above, some contact. Mainly at Southern and also Love grass, Scaevola, etc.
3 = Very Good (Good)	
4 = Good (Poor)	
5 = Degraded (Very Poor)	
6 = Completely Degraded	

partial clearing	<u>Golf course, pony club, ovals</u>				
weeds	<u>Lopid. laev, Gladiolus, Tagaste, Love Grass, Veldt Grass, Aca. long, Gerald. Hex.</u>				
selective removal of species	timber cutting	mowing	% dieback		
fire frequency	<u>does not seem to have been burnt.</u>				
'enrichment plantings'	<u>trees, shrubs etc</u>				
animal impact	<u>(horse)</u>	foxes	<u>(rabbits)</u>	cats	dogs goats pigs overgrazing by native mammals
soil movement	mining	<u>(dumping)</u>	<u>(rubbish dumping)</u>	roadworks	
changes in water regimes	<u>(flooding)</u>	<u>(drainage)</u>	<u>(watering)</u>	<u>(nutrient influx)</u>	
Tracks	<u>(fire breaks)</u>	<u>(walk trails)</u>	<u>(off road vehicle use)</u>	<u>(animal tracks)</u>	
Service corridors	SEC	<u>(Main Roads)</u>	<u>(Water Authority)</u>	Telecom	
Other	<u>Gas line</u>				

**Department of Environmental Protection System 6 Update: Site Based Flora List for Hartfield Park**  
(Hart01-04, B.J. Keighery, 19/2/96)

Anthericaceae

Caesia occidentalis  
Thysanotus arbuscula  
Thysanotus patersonii  
Thysanotus sparteus  
Tricoryne tenella

Apiaceae

Trachymene pilosa

Asteraceae

\* Hypochaeris glabra  
Milotia tenuifolia  
Siloxerus humifusus  
\* Sonchus oleraceus  
\* Ursinia anthemoides

Caesalpiniaceae

Labichea punctata

Campanulaceae

Wahlenbergia preissii

Casuarinaceae

Allocasuarina fraseriana  
Allocasuarina humilis

Centrolepidaceae

Brizula sp. scps  
Centrolepis drummondiana

Colchicaceae

Burchardia congesta  
Burchardia umbellata

Crassulaceae

Crassula pedicellosa

Cupressaceae

Actinostrobus pyramidalis

Cyperaceae

Lepidosperma sp. scps  
Mesomelaena pseudostygia  
Mesomelaena tetragona  
Schoenus curvifolius  
Schoenus elegans  
Schoenus rodwayanus  
Tetraria octandra

Dasypogonaceae

Calectasia cyanea  
Dasypogon bromeliifolius  
Dasypogon obliquifolius  
Kingia australis  
Lomandra preissii  
Lomandra sericea

Dilleniaceae

Hibbertia aff helianthemoides scps map  
Hibbertia huegelii  
Hibbertia hypericoides

Droseraceae

Drosera erythrorhiza  
Drosera macrantha subsp. macrantha  
Drosera menziesii subsp. penicillaris  
Drosera zonaria

Epacridaceae

Leucopogon conostephioides

Euphorbiaceae

Monotaxis grandiflora  
Stachystemon vermicularis

Goodeniaceae

Scaevola repens

Haemodoraceae

Anigozanthos humilis  
Conostylis aculeata  
Conostylis aurea

Conostylis setigera  
Haemodorum paniculatum  
Haemodorum sp. scps  
Phlebocarya ciliata  
Tribonanthes australis

Iridaceae

\* Gladiolus caryophyllaceus  
Patersonia occidentalis

Lamiaceae

Hemiandra pungens

Lauraceae

Cassytha racemosa  
Cassytha sp. scps

Loganiaceae

Mitrasacme paradoxa

Myrtaceae

Astartea aff. fascicularis sthst  
Calothamnus hirsutus  
Conothamnus trinervis  
Eremaea pauciflora  
Eucalyptus marginata  
Eucalyptus todtiana  
Hypocalymma angustifolium  
Leptospermum spinescens  
Melaleuca sp. B FPR (BJK&NG 054)  
Melaleuca trichophylla  
Melaleuca viminea  
Pericalymma ellipticum  
Verticordia densiflora  
Verticordia lindleyi

Orchidaceae

Caladenia flava  
Lyperanthus nigricans  
Prasophyllum sp. APB (Forrestfield) scps

Papilionaceae

Bossiaea eriocarpa  
Daviesia decurrens  
Daviesia horrida  
Daviesia nudiflora  
Daviesia triflora

Eutaxia virgata  
Gompholobium scabrum  
Gompholobium tomentosum  
Jacksonia densiflora  
Nemcia reticulata

Pittosporaceae

Pronaya fraseri

Poaceae

\* Aira caryophyllea  
Amphipogon turbinatus  
\* Briza maxima  
Neurachne alopecuroidea  
Stipa macalpinei  
Stipa sp. scps  
\* Vulpia sp. scps

Polygalaceae

Comesperma sp. scps

Portulacaceae

Calandrinia sp. scps

Proteaceae

Banksia attenuata  
Banksia menziesii  
Conospermum undulatum  
Dryandra armata  
Dryandra nivea  
Hakea auriculata  
Hakea conchifolia  
Hakea incrassata  
Hakea trifurcata  
Isopogon drummondii  
Lambertia multiflora  
Persoonia saccata  
Petrophile divaricata  
Petrophile linearis  
Petrophile macrostachya  
Stirlingia latifolia  
Synaphea spinulosa

Restionaceae

Alexgeorgea nitens  
Leptocarpus aristatus  
Leptocarpus coangustatus  
Loxocarya fasciculata

*Loxocarya flexuosa*

Rutaceae

*Eriostemon spicatus*

Solanaceae

\* *Solanum nigrum*

Stylidiaceae

*Stylidium calcaratum*

*Stylidium carnosum*

*Stylidium piliferum*

*Stylidium repens*

Thymelaeaceae

*Pimelea sp. scps*

Xanthorrhoeaceae

*Xanthorrhoea drummondii*

**Department of Environmental Protection System 6 Update: Site Based Flora List for  
Hartfield Park Threatened and/or Poorly Reserved Plant Community Area**  
(165 taxa, Hart01-04, B.J. Keighery, 7/6/96)

127  
Anthericaceae

Caesia occidentalis  
Thysanotus arbuscula  
Thysanotus patersonii  
Thysanotus sparteus  
Tricoryne tenella

Apiaceae

Trachymene pilosa

Asteraceae

\* Hypochaeris glabra  
Millotia tenuifolia  
Siloxerus humifusus  
\* Sonchus oleraceus  
\* Ursinia anthemoides

Caesalpiniaceae

Labichea punctata

Campanulaceae

Wahlenbergia preissii

Casuarinaceae

Allocauarina fraseriana  
Allocauarina humilis

Centrolepidaceae

Brizula sp. scps  
Centrolepis drummondiana

Colchicaceae

Burchardia congesta

Crassulaceae

Crassula pedicellosa

Cupressaceae

Actinostrobus pyramidalis

Cyperaceae

Lepidosperma eastern terete scps (BJK&NG 232)  
Mesomelaena pseudostygia  
Mesomelaena tetragona  
Schoenus curvifolius  
Schoenus elegans  
Schoenus rigens  
Schoenus rodwayanus  
Tetraria octandra

Dasypogonaceae

Calectasia cyanea  
Dasypogon bromeliifolius  
Dasypogon obliquifolius  
Kingia australis  
Lomandra hermaphrodita  
Lomandra preissii  
Lomandra sericea

Dilleniaceae

Hibbertia aff helianthemoides scps map  
Hibbertia huegelii  
Hibbertia hypericoides

Droseraceae

Drosera erythrorhiza  
Drosera macrantha subsp. macrantha  
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Epacridaceae

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Euphorbiaceae

Monotaxis grandiflora  
Stachystemon axillaris

Goodeniaceae

Scaevola repens var. repens

Haemodoraceae

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Conostylis aculeata  
Conostylis aurea

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Haemodorum paniculatum  
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Tribonanthes australis

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Loganiaceae

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Calothamnus hirsutus  
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Eremaea pauciflora  
Eucalyptus marginata  
Eucalyptus todtiana  
Hypocalymma angustifolium  
Leptospermum spinescens  
Melaleuca aff. trichophylla scps  
Melaleuca sp. B FPR (BJK&NG 054)  
Melaleuca viminea  
Pericalymma ellipticum  
Verticordia densiflora  
Verticordia lindleyi subsp. lindleyi

Orchidaceae

Caladenia flava  
Lyperanthus nigricans  
Prasophyllum sp. scps

Papilionaceae

Bossiaea eriocarpa  
Daviesia decurrens  
Daviesia horrida  
Daviesia nudiflora

Daviesia triflora  
Eutaxia virgata  
Gompholobium scabrum  
Gompholobium tomentosum  
Jacksonia densiflora  
Nemcia reticulata

Pittosporaceae

Pronaya fraseri

Poaceae

\* Aira caryophyllea  
Amphipogon turbinatus  
\* Briza maxima  
Neurachne alopecuroidea  
Stipa macalpinei  
Stipa sp. scps  
\* Vulpia sp. scps

Polygalaceae

Comesperma sp. scps

Portulacaceae

Calandrinia sp. scps

Proteaceae

Banksia attenuata  
Banksia menziesii  
Conospermum undulatum  
Dryandra armata  
Dryandra nivea  
Hakea auriculata  
Hakea conchifolia  
Hakea incrassata  
Hakea trifurcata  
Isopogon drummondii  
Lambertia multiflora var. darlingensis MS  
Persoonia saccata  
Petrophile linearis  
Petrophile macrostachya  
Petrophile seminuda  
Stirlingia latifolia  
Synaphea spinulosa

Restionaceae

Alexgeorgea nitens  
Leptocarpus aristatus

Leptocarpus coangustus  
Loxocarya fasciculata  
Loxocarya flexuosa

Rutaceae

Eriostemon spicatus

Solanaceae

\* Solanum nigrum

Stylidiaceae

Stylidium calcaratum  
Stylidium carnosum  
Stylidium piliferum  
Stylidium repens

Thymelaeaceae

Pimelea sp. scps

Xanthorrhoeaceae

Xanthorrhoea drummondii



Chief Executive  
Shire of Kalamunda  
PO Box 42  
KALAMUNDA WA 6076

**Head Office:**  
8th Floor, Westraila Square  
141 St Georges Terrace  
Perth, Western Australia 6000  
Tel (09) 222 7000 Fax (09) 322 1598

**Waste Management Division:**  
Ground Floor, 32 St Georges Terrace  
Perth, Western Australia 6000  
Tel (09) 222 0422 Fax (09) 222 0455  
or PO Box Y3030, East, St Georges Terrace  
Perth, Western Australia 6832

**Regional Offices:**  
Bunbury • Karratha • Kalgoorlie • Kwinana

Your Ref

Our Ref

Enquiries

67/91

N Thorning

ATTENTION: MR DALE ALLEN

### SYSTEM SIX UPDATE PROGRAMME - FLORA SURVEY INFORMATION

Thank you for providing permission for our botanical team to survey the bushland on your property. As arranged between Mr Dave Allen and Miss Natalie Thorning of this Department, the bushland on Maida Vale Reserve and Hartfield Park was visited on 27 and 29 September 1995, respectively.

The botanical survey provides us with information on the natural plant communities found in the area, and their condition. This information is needed to assist the Department of Environmental Protection in its programme to update the conservation recommendations for System 6 and the coastal plain portion of System 1. The main objective of the programme is to ensure that the proposed conservation estate is representative of the ecological communities extant in the region.

As part of this programme the Department has advertised for the public to submit areas of bushland that they consider to be of regional significance. Our botanical team is surveying these submitted areas as well as those it considers may be important based on other factors such as their location and soil type etc. The botanical survey provides us with information on the natural plant communities found in the area, and their condition. Please note that the area is one of many sites that we have surveyed. The fact that we visited and surveyed the site does not indicate that it will necessarily be included in the updated System Six Recommendations.

The update programme has employed the botanical survey methodology used in Gibson et al. (1994), 'A Floristic Survey of the Southern Swan Coastal Plain', to provide the main information base upon which to review the adequacy of the existing System recommendations and to assess other bushland areas.

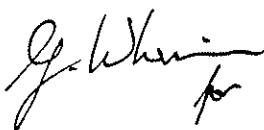
Two (Maida Vale) and four (Hartfield) survey sites were located on the properties and metal fence droppers were left in each corner of the 10 metres by 10 metres square survey sites. We may wish to revisit these sites at a later date, if so, we will contact you prior to our visit. A general description of the vegetation and an assessment of its condition was also completed.

The information collected during the visits will be used to assess the relative conservation values of the bushland areas. The final selections for inclusion in the updated System Six Recommendations will be the best possible examples of bushland containing plant community types that are either unrepresented or poorly represented in the current and proposed conservation system.

If you are interested in the information we have collected, the location of the survey sites or any other additional information on the System Six Update Programme please don't hesitate to contact Miss Natalie Thorning (222 7051) or Mr Kevin McAlpine (222 7055).

Once again, thank you very much for your support for this programme.

Yours sincerely

A handwritten signature in black ink, appearing to read 'Colin Sanders', with a stylized flourish underneath.

Colin Sanders  
DIRECTOR  
POLICY AND STRATEGIC STUDIES

23 November 1995

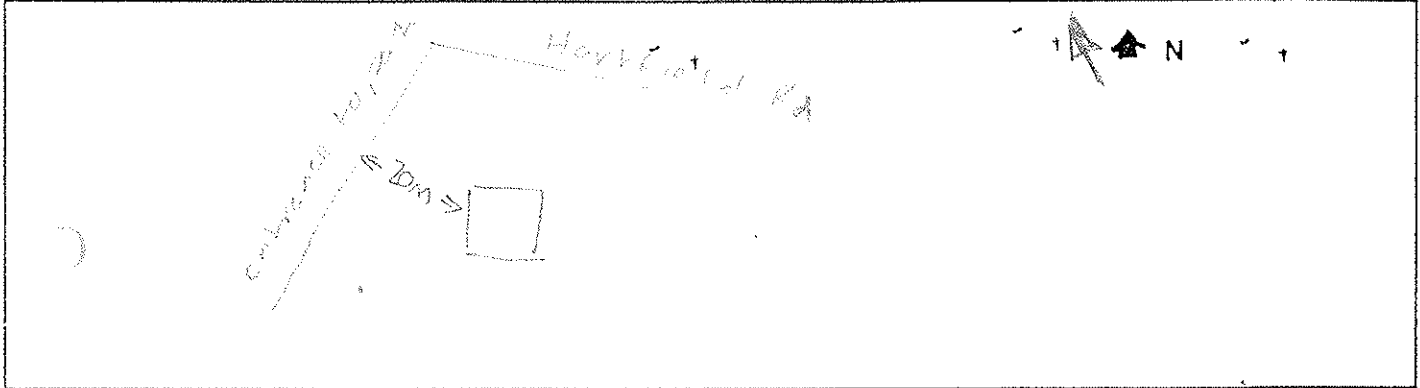
BUSHLAND PLANT SURVEY RECORDING SHEET 1- use pencil only

BUSHLAND AREA WARTFIELD PARK SITE NUMBER WAPT 91  
 DATE TRIP 29/7/95 RECORDERS SVK AKT  
 DATE TRIP \_\_\_\_\_ RECORDERS \_\_\_\_\_  
 DATE TRIP \_\_\_\_\_ RECORDERS \_\_\_\_\_  
 BOTANIST \_\_\_\_\_

From 'Bushland Plant Survey' written by B. Keighery (1994) and published by the Wildflower Society of WA (Inc.), PO Box 4 Nedlands WA 6008.

1. LOCATION of the QUADRAT

Mud Map Draw a sketch of the location of the site below.



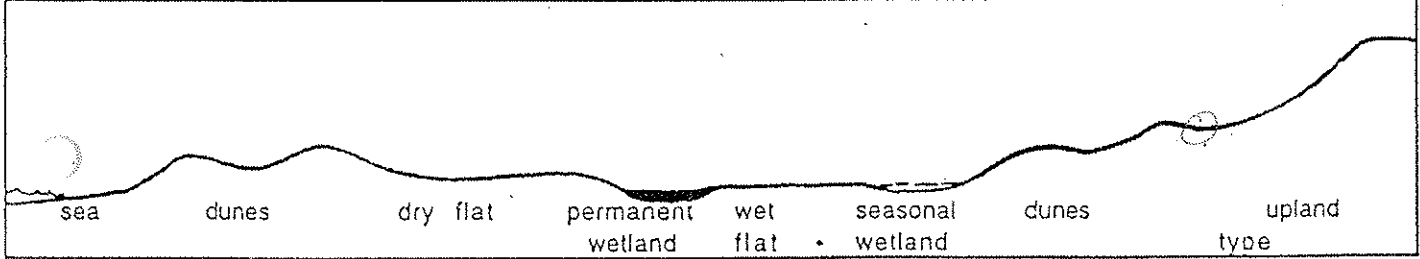
Road Location Road on left side off Wartfield Road

Geographic Location Latitude 31°59.593' S Longitude 116°00.446' E Altitude \_\_\_\_\_

Reference Map \_\_\_\_\_

Photograph \_\_\_\_\_ Photographer's Name NOT Photo No 7

Topographic position Circle position of site on the transect (alter the transect if necessary)



2. SITE DATA Circle the correct response.

Slope flat gentle steep Aspect N NE E SE S SW W NW

Surface Soil Sand lots of humus Colour brown  
 Exposed rock type \_\_\_\_\_ % surface \_\_\_\_\_

Sub-surface Soil 3 cm Colour \_\_\_\_\_  
 Rock type \_\_\_\_\_ depth to rock \_\_\_\_\_

Drainage well mod poor depth water cm Wet all year winter/spring

Litter	<u>70+</u> % cover	Bare Ground	<u>22</u> % cover
Depth	<u>10</u> cm		








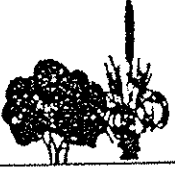





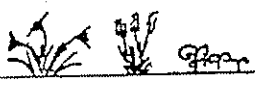
BUSHLAND PLANT SURVEY RECORDING SHEET 2 (Muir)- use pencil only

From 'Bushtand Plant Survey' written by B. Keighery (1994) and published by the Wildflower Society of WA Inc., PO Box 64 Nedlands WA 6008.

3. VEGETATION STRUCTURE AND COVER

For each layer record - appropriate life form, cover class (see below) and dominant species in each layer.

Cover Class            2-10%            10-30%            30 - 70%            over 70%

TREES			MALLEES	
over 30m	15 - 30m	5 - 15m	over 3m	under 3m
		 Lanceolata		
LIFE FORM		under 5m		30m  10m
COVER CLASS (%)		30-70		
DOMINANT SPECIES		Alphitonia E. marginata		
SHRUBS			SHRUBS	
over 2m	2m - 1.5m	1.5 - 1m	1 - 0.5m	under 0.5m
		 Low Sedges & Low Heath		
LIFE FORM				2m  1m
COVER CLASS (%)		15-30	30-70	
DOMINANT SPECIES		South daisy Hakea	Low Heath	
GRASSES	HERBS	SEDGES	over 0.5m	under 0.5m
				 Low Sedges
LIFE FORM				1m
COVER CLASS (%)				30-70
DOMINANT SPECIES				Mass. tet. Mass. pseudo

4. VEGETATION CONDITION

1	'PRISTINE'		COMMENTS Dying in the area 2 rabbits (19) (empty soon)
2	EXCELLENT	✓	
3	VERY GOOD		
4	GOOD		
5	DEGRADED		



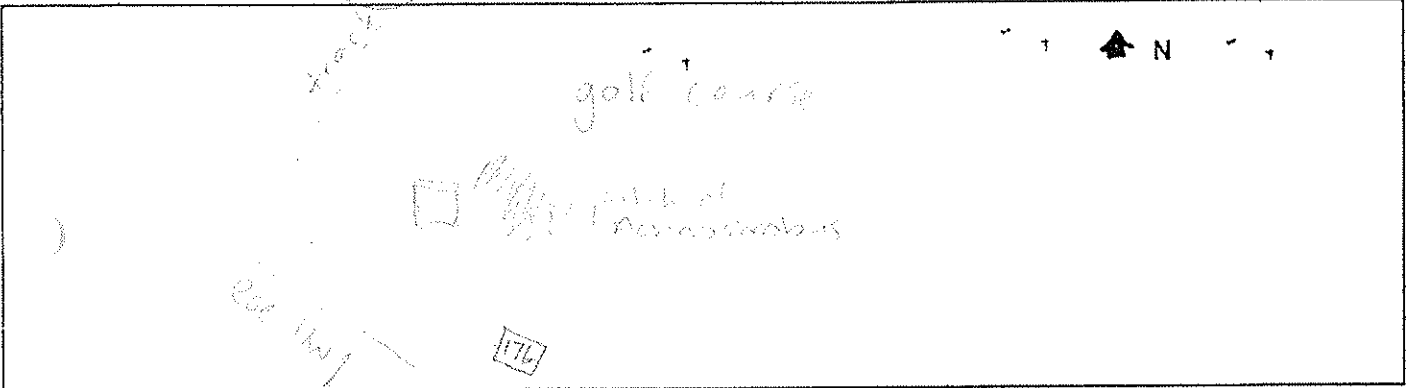
BUSHLAND PLANT SURVEY RECORDING SHEET 1- use pencil only

BUSHLAND AREA Mud Map SITE NUMBER PART 2  
 DATE TRIP 27/7/95 RECORDERS BTE NCT  
 DATE TRIP \_\_\_\_\_ RECORDERS \_\_\_\_\_  
 DATE TRIP \_\_\_\_\_ RECORDERS \_\_\_\_\_  
 BOTANIST \_\_\_\_\_

From 'Bushland Plant Survey' written by B. Keighery (1994) and published by the Wildflower Society of WA (Inc.), PO Box 12, Nedlands WA 6008

1. LOCATION of the QUADRAT

Mud Map Draw a sketch of the location of the site below.



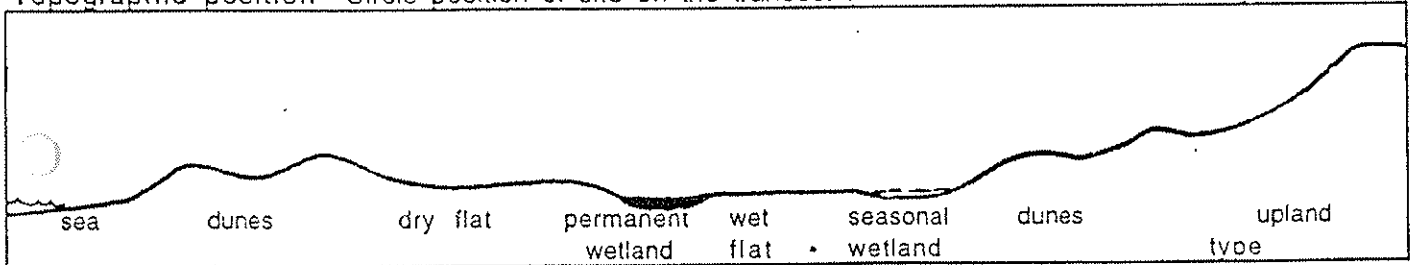
Road Location Roe Hwy

Geographic Location Latitude 31° 59' 44.5" S Longitude 115° 59' 88.9" E Altitude 786

Reference Map

Photograph Photographer's Name NCT Photo No 10

Topographic position Circle position of site on the transect (alter the transect if necessary)



2. SITE DATA Circle the correct response.

Slope flat gentle steep Aspect N NE E SE S SW W NW

Surface Soil sandy clay Colour brown  
 Exposed rock type \_\_\_\_\_ % surface \_\_\_\_\_

Sub-surface Soil Colour \_\_\_\_\_  
 Rock type \_\_\_\_\_ depth to rock \_\_\_\_\_

Drainage well mod poor depth water \_\_\_\_\_ cm Wet all year winter/spring

Litter \_\_\_\_\_ 30-70 % cover \_\_\_\_\_  
 Depth \_\_\_\_\_ cm Bare Ground 2 % cover \_\_\_\_\_















BUSHLAND PLANT SURVEY RECORDING SHEET 2 (Muir) - use pencil only

From 'Bushtand Plant Survey' written by B. Kerghery 1994 and published by the Wildflower Society of WA, Inc. 170 Box 84 Sealands WA 6055

3. VEGETATION STRUCTURE AND COVER

For each layer record - appropriate life form, cover class (see below) and dominant species in each layer.

Cover Class      2-10%      10-30%      30-70%      over 70%

	TREES			MALLEES		
	over 30m	15-30m	5-15m under 5m	over 3m	under 3m	
LIFE FORM						
COVER CLASS (%)						
DOMINANT SPECIES						
					30m	
					10m	
		SHRUBS			SHRUBS	
		over 2m	2m - 1.5m	1.5 - 1m	1-0.5m	under 0.5m
LIFE FORM				Heath 		Dense Low Heath 
COVER CLASS (%)				30-70		2-70 70+
DOMINANT SPECIES		<i>R. ...</i> <i>N. ...</i>	<i>Peri ...</i>			<i>... ..</i>
						2m
						1m
		GRASSES	HERBS	SEDGES	under 0.5m	
				over 0.5m		
LIFE FORM				Very open tall sedge 	Awake Scrub 	
COVER CLASS (%)				2-10	10-30	
DOMINANT SPECIES				<i>Lepidocladus ...</i>	<i>Schoenus ...</i>	
					1m ?? check	

4. VEGETATION CONDITION

1	'PRISTINE'	COMMENTS Drought tracks (not permanent, vehicles over veg)
2	EXCELLENT	
3	VERY GOOD	
4	GOOD	
5	DEGRADED	



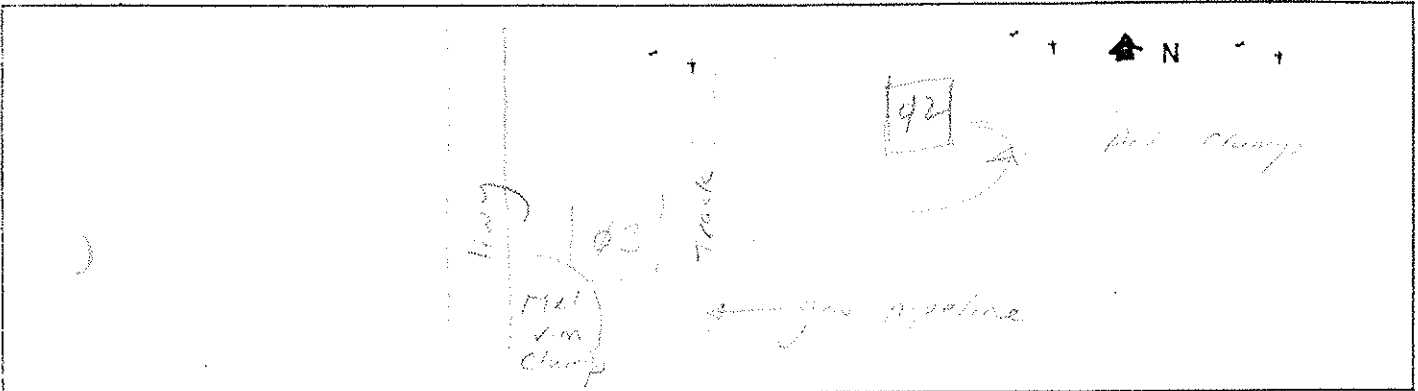
BUSHLAND PLANT SURVEY RECORDING SHEET 1- use pencil only

BUSHLAND AREA HARTFIELD PARK SITE NUMBER WAPT 03  
 DATE TRIP 18/9/95 RECORDERS BJK/NT  
 DATE TRIP \_\_\_\_\_ RECORDERS \_\_\_\_\_  
 DATE TRIP \_\_\_\_\_ RECORDERS \_\_\_\_\_  
 BOTANIST \_\_\_\_\_

From 'Bushland Plant Survey' written by B. Keighery (1994) and published by the Wildflower Society of WA (Inc.), PO Box 4 Nedlands WA 6008.

1. LOCATION of the QUADRAT

Mud Map Draw a sketch of the location of the site below.

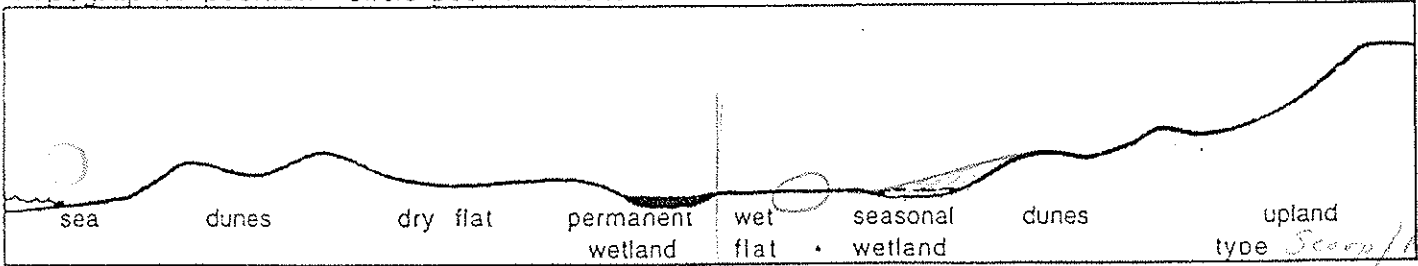


Road Location \_\_\_\_\_

Geographic Location Latitude 31° 59.970 S Longitude 115° 59.867 E Altitude NA  
 Reference Map \_\_\_\_\_

Photograph \_\_\_\_\_ Photographer's Name BJK NT Photo No 11

Topographic position Circle position of site on the transect (alter the transect if necessary)



2. SITE DATA Circle the correct response.

Slope flat gentle steep Aspect N NE E SE S SW W NW

Surface Soil (grey) clay sand Colour grey  
 Exposed rock type \_\_\_\_\_ % surface \_\_\_\_\_

Sub-surface Soil grey clay sand Colour grey  
 Rock type ironstone depth to rock putty 50cm

Drainage well mod poor depth water \_\_\_\_\_ cm Wet all year winter/spring

Litter \_\_\_\_\_ 10 - 30% cover \_\_\_\_\_ Bare Ground 2-10 %cover \_\_\_\_\_  
 Depth \_\_\_\_\_ cm













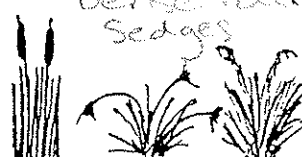

BUSHLAND PLANT SURVEY RECORDING SHEET 2 (Muir)- use pencil only

From 'Bushland Plant Survey' written by B. Keighery - 1994 and published by the Wildflower Society of WA Inc., PO Box 64 Nedlands WA 6008.

3. VEGETATION STRUCTURE AND COVER

For each layer record - appropriate life form, cover class (see below) and dominant species in each layer.

Cover Class      2-10%      10-30%      30 - 70%      over 70%

TREES				MALLEES	
over 30m		15 - 30m	5 - 15m	over 8m	under 8m
LIFE FORM					
			under 5m		
COVER CLASS (%)					
DOMINANT SPECIES					
					30m
					10m
SHRUBS			SHRUBS		
over 2m		2m - 1.5m	1.5 - 1m	1 - 0.5m	under 0.5m
LIFE FORM		<i>open low scrub A</i> 	<i>open low scrub B</i> 		
COVER CLASS (%)		2-10	2-10		
DOMINANT SPECIES		<i>Melaleuca</i>	<i>Halimolobos</i> <i>Not all bus</i>		
					2m
					1m
GRASSES		HERBS	SEDGES		under 0.5m
LIFE FORM			<i>Dense tall Sedges</i> 		
COVER CLASS (%)			77%		
DOMINANT SPECIES			<i>Leptocarpus</i>		
					1m

4. VEGETATION CONDITION

		COMMENTS
1	'PRISTINE'	
2	EXCELLENT	
3	VERY GOOD	<i>Tracks horses</i>
4	GOOD	<i>Adj Pampas grass along horse trail</i>
5	DEGRADED	

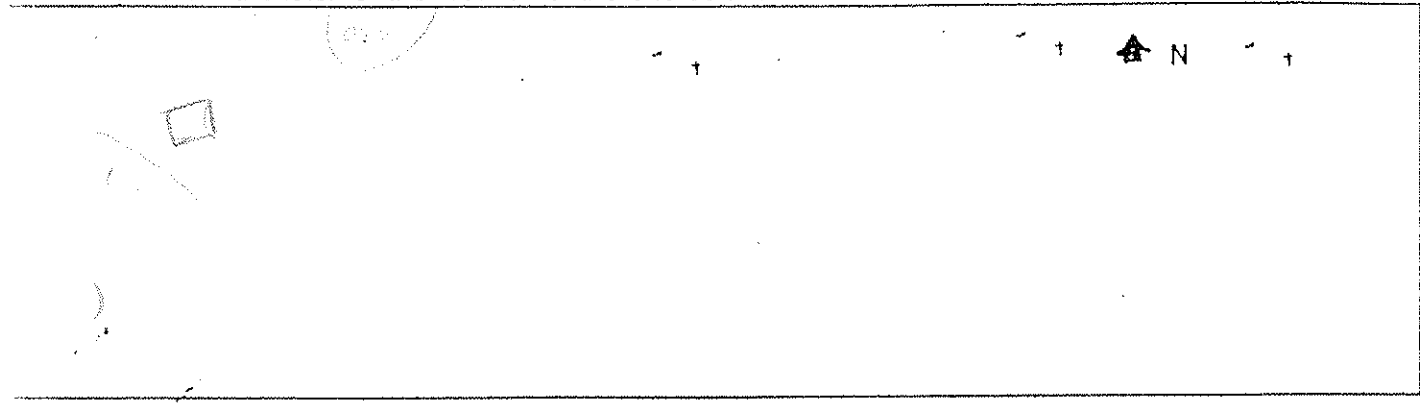


BUSHLAND AREA MANUEL PARK SITE NUMBER 11111  
 DATE TRIP 29/9/95 RECORDERS LJR HT  
 DATE TRIP \_\_\_\_\_ RECORDERS \_\_\_\_\_  
 DATE TRIP \_\_\_\_\_ RECORDERS \_\_\_\_\_  
 BOTANIST \_\_\_\_\_

From 'Bushland Plant Survey' written by B. Keighery (1994) and published by the Wildflower Society of WA (Inc.), PO Box 24 Nedlands WA 6008.

1. LOCATION of the QUADRAT

Mud Map Draw a sketch of the location of the site below.

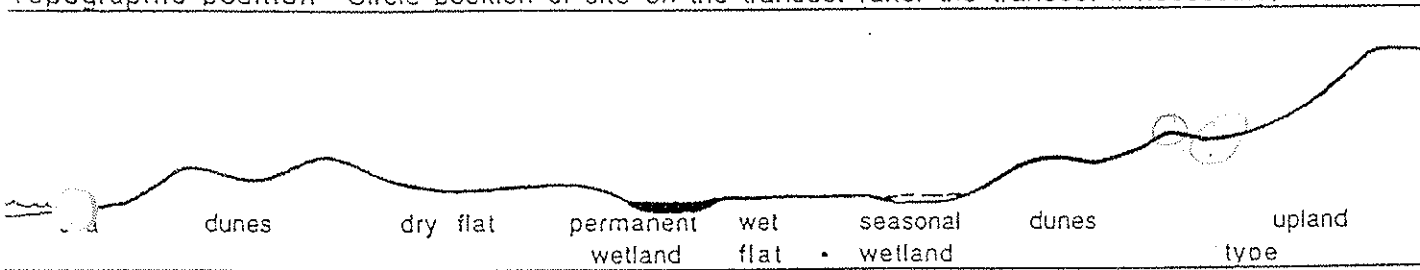


Road Location Queensway

Geographic Location Latitude 31° 57' 104" S Longitude 115° 59' 405" E Altitude \_\_\_\_\_  
 Reference Map \_\_\_\_\_

Photograph Photographer's Name NCS Photo No 12

Topographic position Circle position of site on the transect (alter the transect if necessary)



2. SITE DATA Circle the correct response.

Slope flat gentle steep Aspect N NE E SE S SW W NW

Surface Soil sand Colour brown  
 Exposed rock type \_\_\_\_\_ % surface \_\_\_\_\_

Sub-surface Soil sand Colour brown  
 Rock type \_\_\_\_\_ depth to rock \_\_\_\_\_

Drainage well mod poor depth water \_\_\_\_\_ cm Wet all year winter/spring

Litter	<u>30-70</u>	% cover	Bare Ground	<u>2</u>	% cover
Depth	<u>1-5</u>	cm			













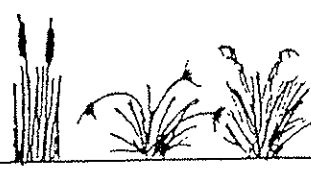
BUSHLAND PLANT SURVEY RECORDING SHEET 2 (Muir)- use pencil only

From 'Bushtand Plant Survey' written by B. Keighery (1994) and published by the Wildflower Society of WA Inc., PO Box 64 Nedlands WA 6008.

3. VEGETATION STRUCTURE AND COVER

For each layer record - appropriate life form, cover class (see below), and dominant species in each layer.

Cover Class      2-10%      10-30%      30 - 70%      over 70%

TREES				MALEES	
over 30m		15 - 30m	5 - 15m	over 8m	under 8m
LIFE FORM			under 5m low woodland A 		
COVER CLASS (%)			10-30		
DOMINANT SPECIES			Bank oak Bank manna		
SHRUBS				SHRUBS	
over 2m		2m - 1.5m	1.5 - 1m	1 - 0.5m	under 0.5m
LIFE FORM				low heath 	
COVER CLASS (%)				30-70	
DOMINANT SPECIES				Solanum sp. Mabb' Acp Atha hum	
GRASSES		HERBS		SEDGES	
over 0.5m		open herbs		over 0.5m	
LIFE FORM					
COVER CLASS (%)		10-30			
DOMINANT SPECIES		Dasyg. obtus.		Open low Sedges Moss pseudo	

4. VEGETATION CONDITION

1	'PRISTINE'	COMMENTS Matted Bracken deaths, many small Bristly hantorns & change in the table Indistinctly visible.
2	EXCELLENT	
3	VERY GOOD	
4	GOOD	
5	DEGRADED	



SYSTEM 6 BUSHLAND SUBMISSION FORM FOR CONSIDERATION IN THE UPDATE PROGRAMME

If you wish to submit more than one area for consideration in the System 6 update, please use a separate form for each area.

Please fill in each section giving as much information as possible.

LOCATION, OWNERSHIP AND ZONING OF THE AREA

1. Location HARTFIELD PARK

Please give as accurate and detailed a description as possible of the site location

Please include either a hand drawn or copied map showing the area of the area

a) Bordering Roads: Hale Road, Hartfield Road, dissected by Tonkin Highway

b) Nearest Corner: .....

c) Lot Number: ..... Street Number: .....

d) Town/Suburb/Location: Forrestfield

e) Local Council: Kalamunda

f) Site Name (if any): Hartfield Park

g) Approximate size of the area (ha): 165 ha

h) Please locate the area on a map and give us map references if possible:

see attached

i) Map: 30 Streetsmart (UBD) Other: .....

j) Map no.: .....

k) Grid Ref: D8

l) Please give any other information that may help us to find the location:

Signage on surrounding roads

m) Are you aware of any development proposals that are likely to affect the area?

NOTE: Areas that have already been given development APPROVAL should not be nominated

Please fill out those questions that you can answer

2. Who owns the area? (If owned by the person/s making the nomination please indicate) ..... Local Authority .....

3. If you own the area, and may be interested in participating in conservation on private land initiatives please indicate (and leave your name and address at the end of this submission form) .....

4. What is the area zoned? (please indicate whether zoning is Town Planning Scheme or Metropolitan Region Scheme) ..... Parks & Rec (MRS) .....

CAN YOU TELL US A LITTLE ABOUT THE PHYSICAL CHARACTERISTICS OF THE AREA

5. Why do you consider this area important? (Refer to Guiding Issues paper) ..... Quality and conservation value of remnant vegetation .....

6. What is/are the soil type/s and colours? sand over clay (Widford Formation)

Type: Sand/Clay/Gravel/Loam/Silt

Colour: White/Grey/Brown/Orange/Yellow/Red/Black

7. Does the area have any special features such as unusual landforms / landscapes that still retain their natural vegetation? Yes/No

If yes, what are they? .....

8. Is the area a wetland or does it include a wetland? Yes

If yes, what kind of a wetlands is it?

a) lake - man made lake subject to rehabilitation

b) river

c) stream

d) swamp

e) estuary

f) seasonally wet

g) other

9. What percentage of the wetland is open water in summer? .....

CAN YOU TELL US A LITTLE ABOUT THE VEGETATION /FAUNA ON THE NOMINATED AREA.

10. What percentage of the area is indigenous vegetation? .....

11. If the area includes regions cleared of native bushland please indicate reasons for the inclusion. ....

12. Has any previous flora or fauna survey work been done on the area?

.....*yes*.....

If yes, please give details of the work .....*See Armstrong Reports (11.04)*.....

13. How would you rate the condition of the native bushland? (see attached table)

- a) pristine
- b) excellent (*in some areas*)
- c) very good
- d) good (*overall*)
- e) degraded
- f) completely degraded
- g) don't know

14. Please indicate the disturbances affecting the area and where appropriate the percentage of the area disturbed.

- a) Partial clearing
- b) fragmentation
- c) Selective removal of species: timber cutting, wildflower picking, mowing dieback and other plant diseases
- d) Fire regime, including intensity, season and frequency
- e) 'Enrichment plantings' that is plantings of species not found in that community
- f) Weed invasion
- g) Animal impact: horses, foxes, rabbits, cats, dogs, camels, goats etc
- h) Soil movement, both removal and dumping
- i) Changes in water regimes; flooding, drainage and watering
- j) Salinity
- k) Fertiliser drift and along waterways nutrient influx
- l) Mining, including that for road works

m) Grazing: stock, overgrazing by feral or native mammals

n) Proliferation of tracks, fire breaks and walk trails

o) Off-road vehicle use

p) Use as service corridors by the SEC, Main Roads, Water Authority.

(Source: B Keighery. Bushland Plant Survey, September 1994)

15. Does the area contain any plant species of special interest that you know of?  
(eg. declared rare flora, priority taxa, outlier populations) *poorly represented*

Do you know what they are? *Refer to Threatened or Poorly Reserved Plant Communities Map*

16. Do you know of any native animals that use the area? *yes*

Can you list those you know of? (birds, mammals, reptiles, amphibians etc)

*birds, mammals, reptiles*

17. Is the area used by any native animals of special interest? (eg. endangered species, large/important populations) *possibly Southern Brown Bandicoot*

If yes, please name them and indicate source of information

.....  
.....

**CAN YOU TELL US A LITTLE ABOUT THE SURROUNDING AREA**

18. Are there any bushland areas (including wetlands) near to this area?

*there is a creekline to the south and system six area M80 approximately 1.5 kms*

If yes, how close are they? *to the west*

.....  
.....

Are they already conservation reserves? *Yes (M80) No (creekline)*

What is their approximate size? .....

19. Does the submitted area link other bushland areas? *links could be established and acquired through future development conditions to form fauna corridor.*

Please attach any additional information about the area which may be of use when assessing it.



Head Office:  
8th Floor, Westralia Square  
141 St Georges Terrace  
Perth, Western Australia 6000  
Tel (09) 222 7000 Fax (09) 322 1598

Regional Offices:  
Bunbury • Geraldton • Kalgoorlie  
Karratha • Kwinana

Shire Clerk  
Shire of Kalamunda  
PO Box 42  
KALAMUNDA WA 6076

*Your Ref* MMcC:GR EV-EPP-018  
*Our Ref* 192/93 103187  
*Enquiries* B Hyder-Griffiths

ATTENTION: Mick McCarthy

## HARTFIELD PARK DRAFT MANAGEMENT PLAN

Thank you for providing us with the opportunity to comment on the draft management plan.

The plan appears to be quite comprehensive and generally incorporates all the relevant issues. However there are a number of specific issues this Department consider need to be addressed, which are outlined below.

### **Regional Significant vegetation 2.2**

I have enclosed a copy of comments from Bronwen Keighery outlining the regional significance of the vegetation which you may wish to incorporate directly into the management plan. The community types found within Hartfield Park are different to those indicated in preliminary discussions with Bronwen Keighery prior to the analysis been undertaken.

### **Botanical Garden**

Currently this area supports a number of species which are not native to the site. It would be beneficial to remove these species and replace them with species that are locally indigenous.

### **Additional Car Parking Facilities 3.5.1**

In relation to the Stage 2 proposal the DEP support the view that it would be totally inappropriate to extend the car park into areas of native vegetation due to the regional significance of the area.

### **Future Recreational Facilities 3.5.4**

It is considered inappropriate with the conservation values of the area to include a recreation centre east of the existing recreation centre within the Jarrah Banksia woodland in very good condition.



### **Weed Control 4.1.2**

The use of controlled burns as a means of controlling *Watsonia* species is not generally a recommended method. However we appreciate that you consider this to be an effective means of controlling *Watsonia* and recommend that extreme caution is used to ensure that only the *Watsonia* is burnt. A map showing the areas of weed infestation would be a very useful addition.

### **Revegetation 4.1.3**

This section could be improved if it were expanded or incorporated a recommendation to prepare a detailed revegetation programme in conjunction with weed control. Prior to any seed being collected from the site CALM should be contacted to see if a licence is required.

### **Feral Animal Control 4.1.6**

While the use of a feral proof fence has been suggested on a number of occasions within the management plan it has not been discussed under the section on feral animal control. It would be an appropriate opportunity to discuss the pros and cons of a fence. The cost of installing a feral proof fence is very high as is maintenance. A feral proof fence will also restrict the movement of fauna between the north and south areas of the park. Suggest this is a low priority unless the fauna survey identifies populations of significant species that would benefit from a feral proof fence.

### **Management Zones 4.2**

The zoning of the vegetation in the Jarrah-Banksia Sheoak low forest and Marri-Jarrah low Forrest in the north of Hartfield Park needs to be considered as this is regionally significant and is currently proposed for conservation and recreation. It may be more appropriate to include this area within the conservation management zone.

### **Implementation**

A programme of monitoring and reviewing the management practices in the Park should be included together with a mechanism for reviewing the plan. Consideration should be given to setting up an Implementation Committee to oversee, advise and coordinate implementation of the plan. The group would perhaps best be made up of representatives from LGA staff, council, residents and interested community groups. Such a group would have the added benefit of formalising a communication channel with the local community that could minimise potential conflict or misunderstanding over programmes that are implementing the plan.

### **Small errors and mistakes.**

Through out section 2.2 plant names have changed from common to scientific and neither is being consistently used. The names of plants should be used consistently ie either the common or scientific names with the alternative in brackets if required.

Pg 9 section 2.2.2 para 4 line 4 should read Hartfield Park **be**

Pg 14 section 2.2.9 para 2 line 1 should read *Melaleuca priessiana*

Pg 18 section 2.2.16 para line 1 should read '...adjacent Golf Course...'

Pg 20 section 2.5.1 para 1 line 1 Yule Brook is referred to on a number of occasions but it is not shown on any of the maps. It would be valuable if the area was labelled on one of the maps.

Pg 23 section 3.4 para 2 line 4 should read '...excised from...'

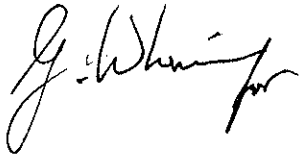
Pg 24 section 3.4.1 para 1 line 1 should read '...is a **popular** recreation...'

Pg 30 section 4.2.2 para 3 line 5 should read '...collected native seed.'

I hope you will find these comments useful, if you have any further queries please do not hesitate to contact Bridget Hyder-Griffiths (Ph 2653 354).

Please will you forward a copy of the final management plan. I look forward to seeing the implementation of the plan.

Yours faithfully

A handwritten signature in black ink, appearing to read 'R.A.D. Sippe', written in a cursive style.

R.A.D. Sippe  
DIRECTOR  
POLICY COORDINATION DIVISION

17 December 1996

## Hartfield Park Management Plan

### Description of the Regional Significance of the vegetation in Hartfield Park (page 9)

In 1995 a series of bushland areas were identified by the EPA as being "Threatened and poorly reserved plant communities in need of interim protection." under the System 6 Update. The majority of these areas are from the eastern side of the Swan Coastal Plain. It has been estimated that the eastern side of Swan Coastal Plain is 97% cleared of vegetation (CALM, 1990). The Wheatbelt considered to be 93% cleared (Beard, 1990) has been the subject of intensive study, in the past 15 years but the eastern side of the Swan Coastal Plain has received comparably scant attention even though Beard noted in the same publication that there was "...no virgin vegetation left" on the eastern side of the Swan Coastal Plain. This situation has been recognized for some time and the two most recent regional studies of the Plain (Keighery and Trudgen 1992 and Gibson *et al.* 1994) both made direct recommendations concerning the high conservation value of all remnants on the eastern side of the Plain, regardless of the size of the remnant.

The bushland in Hartfield Park was identified by Keighery and Trudgen (1992) as an area of high conservation value with the recommendation that

"CALM liaise urgently with the body to which the land is vested to retain and manage the area for its flora conservation values. Any development should be confined to the severely degraded areas."

Hartfield Park was not included in the regional study of the floristic variation of the southern Swan Coastal Plain by Gibson *et al.* (1994). However further floristic work for the System 6 Update (Department of Environmental Protection 1996) in Hartfield Park has identified three floristic community types in the area: type 20a (*Banksia attenuata* woodlands over species rich dense shrublands), type 23a (Central *Banksia attenuata* - *B. menziesii* woodlands) and type 'S2' (northern *Pericalymma ellipticum* dense low shrublands) (Table). Type 'S2' is a new wetland floristic group identified by the Update work. The area of Marri woodlands along the creekline is expected to classify as type 3 (Marri woodlands). Three floristic community types were recognised in these Marri Woodlands, types 3a, 3b and 3c, but the condition of this area is such that this area was not able to be sampled.

Floristic community type 20a and all of type 3 are confined to the eastern side of the Plain, the floristic work confirming the recognition of the area as containing threatened and poorly reserved communities. Also additional work by CALM on the conservation status of plant communities (Department of Conservation and Land Management 1996) has proposed type 20a be considered "Endangered", and that all type 3 Marri Woodlands are threatened communities (type 3a and 3c, "Critically Endangered"; type 3b, "Vulnerable"). Types 23a and 'S2' have not been assessed at this time. However type 23a is confined to the Perth Metropolitan Area and the occurrence of type 'S2' in Hartfield Park is the most southern known occurrence of this type.

The three woodland types identified in Hartfield Park are characterised by high species richness, average species richness per 10m<sup>2</sup> site ranging from 48 (type 3c) to 62.8 (type 23a) and 67 (type 20a). Type 20a woodlands are the most species rich of those woodlands commonly dominated by *Banksia* species.

An earlier publication on the Darling Region (Heddle *et al.* 1983) that mapped a series of vegetation complexes across the Swan Coastal Plain and Plateau places Hartfield Park in the Forrestfield Complex. Recent mapping of remnant vegetation on the Swan Coastal Plain for the Perth Environmental Project has found that less than ten percent of the complex remains uncleared (J. Dixon pers. comm. 11/9/95).

Therefore all current regional information on the flora and vegetation of Hartfield Park clearly identifies the vegetation as having outstanding conservation value.

**Table**

Regional Conservation Status of the Floristic Community Types from Gibson *et al.* 1994 and System 6/1 Update (Department of Environmental Protection 1996). A \* indicates that the type has been inferred from the description of the vegetation of the area.

Vegetation type (as mapped) Floristic Community Type	Reservation Status#	Conservation Status
---	------------------------	------------------------

**Woodlands****Marri Low Woodland**

\*3 Marri woodlands

Present in one Cons. Reserves#

Vulnerable

**Marri - Jarrah Low Forest, Banksia Woodland, Jarrah - Banksia - Sheoak Low Woodland, Jarrah - Banksia - Sheoak Low Forest, Sheoak - Jarrah Low Woodland, Sheoak Low Woodland**20a *Banksia attenuata* woodlands over species rich dense shrublands

Not present in any Cons. Reserve#

Endangered

**Jarrah - Banksia Woodland, Banksia Open Low Woodland**23a Central *Banksia attenuata* - *B. menziesii* woodlands

Present in two or more Cons. Reserves# Low Risk

**Wetlands****Dense Heath, Melaleuca Open Low Woodland, Heath with *Actinostrobus***S2 northern *Pericalymma ellipticum* dense low shrublands

# Conservation Reserves are National Parks or Nature Reserves

**References**

Department of Conservation and Land Management (1996) Threatened Ecological Communities DRAFT classification of communities. An unpublished report.

Department of Environmental Protection (1994 -1996) System 6 Update Programme. Unpublished site and area records and analysis.

Gibson, N., Keighery, B.J., Keighery, G.J., Burbidge, A. and Lyons, M. (1994) A Floristic survey of the southern Swan Coastal Plain. Unpublished report for the Australian Heritage Commission prepared by department of CALM and the Conservation Council of WA (Inc).

Hedde, E.M., Loneragan, O.W. and Havel, J.J. (1980) Vegetation of the Darling System. In "Atlas of Natural Resources, Darling System, Western Australia". Department of Conservation and Environment, Western Australia.

Keighery, B.J. and Trudgen, M.E. (1992) The Remnant Vegetation of the Eastern Side of the Swan Coastal Plain. Unpublished report to the Department of Conservation of Land Management for the National Estate Grants Programme.

## Significant Flora

### Priority Flora (Atkins 1996)

Four priority taxa were identified during regional survey work (Keighery and Trudgen 1992, DEP 1996): *Isopogon drummondii* (Priority 3), *Lambertia multiflora* var. *darlingensis* MS (Priority 3), *Conospermum undulatum* (Priority 4) and *Verticordia lindleyi* subsp. *lindleyi* (Priority 4). Further survey for the Management Plan has identified a further species, *Schoenus benthamii* (3). Several studies have recommended that *Conospermum undulatum* be gazetted as Declared Rare Flora (Kelly *et al.* 1993, Gibson *et al.* 1994). This species is confined to the area between Maida Vale and Hartfield Park.

### Other taxa of interest

*Drosera zonaria*, *Stipa macalpenei*, *Beaufortia squarrosa*, *Dasypogon obliquifolius*, *Hakea conchifolia* and *Xanthorrhoea drummondii* which are all uncommon in the Metropolitan area.

Atkins, K. (21/10/1996) Declared Rare and Priority List for Western Australia. Department of Conservation and Land Management, WA.

Keighery, B.J. and Trudgen, M.E. (1992) The Remnant Vegetation of the Eastern Side of the Swan Coastal Plain. Unpublished report to the Department of Conservation of Land Management for the National Estate Grants Programme.

Kelly, A., Taylor, A., Langley, M.A., Spooner, A. and Coates, D.J.. (1993) Declared Rare Flora and Other Plants in Need of Special Protection in the Metropolitan Region. Wildlife Management Programme 10. Department of Conservation and Land Management, WA

## Hartfield Park Management Plan

### Comments on Regional Significance (page 9)

In 1995 a series of bushland areas were identified by the EPA as being "Threatened and poorly reserved plant communities in need of interim protection." under the System 6 Update. The majority of these areas are from the the eastern side of the Swan Coastal Plain . It has been estimated that the eastern side of Swan Coastal Plain is 97% cleared of vegetation (CALM, 1990). The Wheatbelt considered to be 93% cleared (Beard, 1990) has been the subject of intensive study, in the past 15 years but the eastern side of the Swan Coastal Plain has received comparably scant attention even though Beard noted in the same publication that there was "...no virgin vegetation left " on the eastern side of the Swan Coastal Plain. This situation has been recognized for some time and the two most recent regional studies of the Plain (Keighery and Trudgen 1992 and Gibson *et al.* 1994) both made direct recommendations concerning the high conservation value of all remnants on the eastern side of the Plain, regardless of the size of the remnant.

The bushland in Hartfield Park was identified by Keighery and Trudgen (1992) as an area of high conservation value with the recommendation that

"CALM liaise urgently with the body to which the land is vested to retain and manage the area for its flora conservation values. Any development should be confined to the severely degraded areas."

Hartfield Park was not included in the regional study of the floristic variation of the southern Swan Coastal Plain by Gibson *et al.* 1994. However further floristic work for the System 6 Update (Department of Environmental Protection 1996) in Hartfield Park has identified three floristic community types in the area: type 20a (*Banksia attenuata* woodlands over species rich dense shrublands), type 23a (Central *Banksia attenuata* - *B. menziesii* woodlands) and type 'S2' (northern *Pericalymma ellipticum* dense low shrublands) (Table). Type 'S2' is a new wetland floristic group identified by the Update work. One other floristic community type is also expected to occur in the Park: type 3c (Jarrah - *Xanthorrhoea preissii* woodlands and shrublands).

Two of these floristic community types are 20a and 3c are confined to the eastern side of the Plain, the floristic work confirming the recognition of the area as containing threatened and poorly reserved communities. Also additional work by CALM on the conservation status of plant communities (CALM Threatened Ecological Communities DRAFT classification of communities 1996) has proposed classifying community types 3c as "Critically Endangered" and type 20a as "Endangered". Types 23a and 'S2' have not been assessed at this time. However type 23a is confined to the Perth Metropolitan Area and the occurrence of type 'S2' in Hartfield Park is the most southern known occurrence of this type. The three woodland types identified in Hartfield Park are characterised by high species richness, average species richness per 10m<sup>2</sup> site ranging from 48 (type 3c) to 67 (type 20a).

An earlier publication on the Darling Region (Hedde et al. 1983) that mapped a series of vegetation complexes across the Swan Coastal Plain and Plateau places Hartfield Park in the Forrestfield Complex. Recent mapping of remnant vegetation on the Swan Coastal Plain for the Perth Environmental Project has found that less than ten percent of the complex remains uncleared (J. Dixon pers. comm. 11/9/95).

Therefore all current regional information on the flora and vegetation of Hartfield Park clearly identifies the vegetation as having outstanding conservation value.

**Table**

Regional Conservation Status of the Floristic Community Types from Gibson *et al.* 1994 and System 6/1 Update (Department of Environmental Protection 1996). A \* indicates that the type has been inferred from the description of the vegetation of the area.

Vegetation type (Map Floristic Community Type)	Reservation Status#	Conservation Status
<b>Woodlands</b>		
Marri Low Woodland		
*3c Jarrah - <i>Xanthorrhoea preissii</i> woodlands and shrublands	Present in one Cons. Reserves#	Vulnerable
Marri - Jarrah Low Forest, Banksia Woodland, Jarrah - Banksia - Sheoak Low Woodland, Jarrah - Banksia - Sheoak Low Forest, Sheoak - Jarrah Low Woodland, Sheoak Low Woodland		
20a <i>Banksia attenuata</i> woodlands over species rich dense shrublands	Not present in any Cons. Reserve#	Endangered
Jarrah - <i>Banksia</i> Woodland, <i>Banksia</i> Open Low Woodland		
23a Central <i>Banksia attenuata</i> - <i>B. menziesii</i> woodlands	Present in two or more Cons. Reserves#	Low Risk

**Wetlands**

Dense Heath, *Melaleuca* Open Low Woodland, Heath with *Actinostrobus*  
S2 northern *Pericalymma ellipticum* dense low shrublands

# Conservation Reserves are National Parks or Nature Reserves

**References**

Atkins, K. (14/9/1994) Declared Rare and Priority List for Western Australia. Department of Conservation and Land Management, WA.

Churchward, H.M. and McArthur, W.M. (1980) Landforms and Soils of the Darling System. In "Atlas of Natural Resources, Darling System, Western Australia". Department of Conservation and Environment, Western Australia.

Department of Conservation and Environment. (1983) Conservation Reserves for Western Australia. The Darling System - System 6. Parts 1 & 2. Report 13. Department of Conservation and Environment, Perth.

Department of Conservation and Land Management (unpublished) Draft (1994) Policy Statement on Threatened Communities.

Department of Environmental Protection (1994 -1996) System 6 Update Programme. Unpublished site and area records and analysis.

Gibson, N., Keighery, B.J., Keighery, G.J., Burbidge, A. and Lyons, M. (1994) A Floristic survey of the southern Swan Coastal Plain. Unpublished report for the Australian Heritage Commission prepared by department of CALM and the Conservation Council of WA (Inc).

Keighery, B.J. and Trudgen, M.E. (1992) "The Remnant Vegetation of the Eastern Side of the Swan Coastal Plain." Unpublished report to the Department of Conservation of Land Management for the National Estate Grants Programme.

**Area 16** - Pinjarra Plain in association with Bassendean Sands  
Hartfield Country Club Area, Forrestfield, greater 40 ha (Location 68) - local government

Value - Vegetation. Map, p114

"As a consequence of the small amount of remnant vegetation on the alluvial soils of the eastern side of the Swan Coastal Plain all such remnants in the study area with the basic vegetation structure intact or able to be regenerated (Poor or better Condition) are of significant flora conservation value, regardless of the remnant's size."

position of the Park on the interface between the Ridge Hill Shelf, Pinjarra Plain and Bassendean Dunes further floristic work for the

**Suggested name of area (1996)**

**Some Other Commonly used Names:** Area (ha):  
Hartfield Park T&PR

Total 87, bushland 73 (GIS MRA, 12/92, run15, 5240 aerial photo)  
**Zoning (MRS & town**

**Local Authorities (Suburb planning)**

Shire of Kalamunda (Forrestfield)

Parks and Recreation

**Ownership categories: Street name, Lot number**

**LANDFORM AND SOIL**

**Landscape features:** vegetated wetland, vegetated uplands

**Geomorphology and soils**

**Pinjarra Plain**

Alluvial/colluvial deposit (Qha: Ms4)

**Bassendean Dunes**

Bassendean sands (Qpb: S8)

**Bassendean Dunes/Pinjarra Plain**

Bassendean sands over Guildford Formation (Qpb/Qpa:S10)

**REGIONAL VEGETATION AND FLORA**

**Vegetation Complex**

**Combinations of Bassendean Dunes/Pinjarra Plain**

Southern River Complex

**Floristic Community Types:**

**Supergroup 2: Seasonal Wetlands**

S2 northern *Pericalymma ellipticum* dense low shrublands

**Supergroup 3: Uplands, centred on Bassendean Dunes and the Dandaragan Plateau**

20a *Banksia attenuata* woodlands over species rich dense shrublands

23a Central *Banksia attenuata* - *B. menziesii* woodlands

**REGIONAL WETLANDS**

**Wetland Types:** palusplain, creek, artificial channel

**Consanguineous suite**

**Darling Plateau**

Walyunga (D.1)

**Bassendean - Pinjarra transition OR Bassendean with fluvial features**

Mungala (B/P.2)

**Wetland Management Objective:** Conservation, Resource Enhancement, Multiple Use

**Lake EPP:** none identified

**THREATENED COMMUNITIES/SPECIES**

Not assessed and Endangered (floristic community type 20a)

**AREA DESCRIPTION**

**Vegetation and Flora**

**Structural units:** not known, (limited survey), (detailed survey), (mapping)

Forest Woodland Shrubland Herbland Sedgeland Grassland

Eucalypts - *Eucalyptus calophylla*, *E. wandoo*, *E. marginata*, *E. todtiana*, *E. rudis*, *E. decipiens*, *E. lanepoolei*, *E. haemotoxylon* and *E. gomphocephala*

Sheoaks - *Allocasuarina fraseriana* and *Casuarina obesa*

Banksias - *Banksia attenuata*, *B. menziesii*, *B. prionotes*, *B. ilicifolia*, *B. grandis* and *B. littoralis*

Melaleucas - *Melaleuca preissiana*, *M. raphiophylla* and *M. lanceolata*  
*Callitris preissii*.

*Jacksonia*, *Viminaria*, *Daviesia*, *Leucopogon*, *Regelia*, *Banksia*, *Dryandra*, *Grevillea*, *Hakea*, *Petrophile*, *Stirlingia*, *Gompholobium*, *Calytrix*, *Verticordia*, *Pericalymma*, *Melaleuca*, *Hibbertia*, *Halosarcia*, *Sarcocornia*, *Xanthorrhoea*, *Kingia* and *Acacia*

*Borya*, *Phlebocarya*, *Lomandra*, *Anigozanthos*, *Conostylis*, *Patersonia*, *Drosera* and *Stylidium*  
*Baumea*, *Gahnia*, *Evandra*, *Schoenus*, *Mesomelaena*, *Alexgeorgia*, *Cyathochaeta*, *Loxocarya*, *Leptocarpus*, *Restio* and *Juncus*

*Spinifex*, *Stipa*, *Danthonia* and *Poa*.

**Vegetation Condition:** >30% >50% >75% >90% Pristine, Excellent, Very Good, Good, Degraded, Completely Degraded with % Pristine, Excellent, Very Good, Good, Degraded, Completely Degraded with areas of severe localised disturbance

**Total Flora:** not known, (estimated), (site generated list only), (estimated >50% expected flora), (estimated >75% expected flora), (estimated >90% expected flora)

DRF/Priority - GIS: 3 ID 5694, 5693, 4 ID 5978, 5976, 6175, 6176, 5997, 5979

DRF/Priority and significant flora from survey - *Isopogon drummondii* (3), *Lambertia multiflora* var. *darlingensis* MS (3), *Conospermum undulatum* (4), *Stachystemon axillaris* (4), *Verticordia lindleyi* subsp. *lindleyi* (4)

*Dasyopogon obliquifolius*, *Hakea conchifolia*, *Xanthorrhoea drummondii*

#### Fauna

Mammals: Quenda (*Isodon obesulus*)

**Linkage:** bushland linkage to south (Brixton Street) recognised

**Special Attributes:**

#### INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed

#### CONSERVATION RECOMMENDATIONS

**Criteria met for inclusion:** Representation of ecological communities, Diversity, Rarity, Maintaining ecological systems or natural processes, Scientific or evolutionary importance, General criteria for the protection of wetland, streamline and estuarine fringing and coastal vegetation, Criteria not relevant to determination of conservation value, but which may be applied when evaluating areas having similar values

**Constraints:** Private land, MRS Urban zoning, Mineral Resource Area, Mineral Lease,

**Recommendation:**

**Location 68-** Hartfield Country Club Area, Forrestfield. Location Map 8. Vegetation Map Area 16, p95.

**Veg:** b LOW, b LW, me LOW, ac/p CHt, p CHt, jab W, mj k OF

**Cond:** Very Good

**to Completely Degraded**

#### GENERAL COMMENTS

This vegetation associations at this Location, *Pericalymma ellipticum* and *Hakea sulcata* Closed Heath, *Banksia menziesii* Low Open Woodland, Jarrah, *Banksia menziesii* and *Allocasuarina fraseriana* Woodland to Open Woodland and Marri and Jarrah Open Forest over *Kingia australis* High Open Shrubland are fragmented by developments at the Location such as the Golf Course, Pony Club, clearing for parkland and track proliferation associated with these developments and the Tonkin Hwy.

The *Pericalymma ellipticum* and *Hakea sulcata* Closed Heath with rises of *Banksia menziesii* and *Allocasuarina fraseriana* Low Woodland are generally in Good to Very Good Condition and are the most extensive associations at the Location even though they are dissected by the Tonkin Hwy and partially drained. Within the *Pericalymma ellipticum* and *Hakea sulcata* Closed Heath there are two poorly defined associations, *Melaleuca* Open Low Woodland and an area with scattered *Actinostrobus*.

The remaining intact areas of vegetation are further severely disturbed by inappropriate 'enrichment' planting, rubbish dumping, soil disturbance and weed invasion. With the appropriate management these areas could be maintained.

**Site 68a: sandy clay flats**

**p CH *Pericalymma ellipticum* and *Hakea sulcata* Closed Heath over  
*Verticordia densiflora* Low Open Shrubland over *Leptocarpus  
coangustatus* Sedgeland**

**COMMENTS**

In places the density of *Melaleuca preissiana* increases to form an Open Low Woodland in the eastern section of this vegetation association and there is a area with a *Actinostrobilus pyramidalis* Open Shrubland in a band to the east and west of the Hwy, south of the southern *Banksia* Woodland Ridge.

Trees: Adjacent: occasional *Melaleuca preissiana*

Shrubs: *Pericalymma ellipticum*, *Verticordia densiflora*, 4#*Kingia australis*, ?*Beaufortia squarrosa*, *Gompholobium reticulatum*, *Stirlingia latifolia*

Adjacent: 3,6#*Conospermum undulatum*, *Conospermum teretifolia*, *Astartea fascicularis*, *Hypocalymma angustifolium*

Herbs: *Styidium brunonianum*, *Patersonia aff umbrosa*, *Haemodorum laxum*

Sedges: *Leptocarpus coangustatus*, *Schoenus* sp., *Cyathochaeta avenacea*

**CONDITION**

Rating **Very Good**

Comments: An adjacent drain has probably caused the area to drain more effectively than in the past which could have effects on the vegetation that is dependant on seasonal inundation

Aerial Photo: Run 135181

Soil: grey sandy clay over grey clay, SR (Churchward and McArthur 1980), ?Gf6 (King and Wells 1990)

Drainage: poor

Aspect: flat

**Site 68b: Sandy Rise**

**ba W *Banksia menziesii* Low Open Woodland to Low Open Woodland over  
*Hibbertia hypericoides* and *Eremaea pauciflora* Open Shrubland over  
*Cyathochaeta avenacea* and *Mesomeleana stygia* Sedgeland**

Trees: *Banksia menziesii*, *Allocasuarina fraseriana*, *Eucalyptus marginata*

Shrubs: *Adenanthos cygnorum*, 4#*Lambertia multiflora*, *Verticordia densiflora*, *Hibbertia hypericoides*, *Eremaea pauciflora*, *Bossiaea eriocarpa*, *Xanthorrhoea preissii*, *Stirlingia latifolia*, 3,6#*Conospermum undulatum*, *Synaphaea spinulosa*, *Gompholobium confertum*, *Jacksonia densiflora*, *Beaufortia squarrosa*, *Pericalymma ellipticum*

Adjacent: 4#*Kingia australis*

Herbs: *Patersonia occidentalis*, *Phlebocarya filifolia*, *Dasypogon bromeliifolius*, *Burchardia umbellata*, *Tricoryne elatior*, *Conostylis setigera*, *Conostylis aurea*, *Johnsonia pubescens*, *Scaevola paludosa*, *Lomandra hermaphrodita*

Sedges: *Schoenus* sp, *Tetraria octandra*, *Lyginia barbata*

**CONDITION**

Rating **Good to Very Good**

Comments:

Aerial Photo: Run 13 5181

Soil: grey sand over cream sand, SR (Churchward and McArthur 1980), ?Gf7 (King and Wells 1990)

Drainage: good

Aspect: top of rise, flat

**Site 68c: Sandune.** To the north west Jarrah becomes an important tree species and this association is mapped as **Jarrah, *Banksia* and *Allocasuarina* Woodland**

**ba W *Banksia menziesii*, *Banksia attenuata* and *Allocasuarina  
fraseriana* Low Woodland to Low Open Forest over *Adenanthos  
cygnorum* High Open Shrubland over *Hibbertia hypericoides*, *Isopogon drummondii***

**and Xanthorrhoea preissii Low Open Shrubland over Cyathochaeta  
avenacea and Mesomeleana pseudostygia Sedgeland**

Trees: *Banksia menziesii*, *Banksia attenuata*, *Allocasuarina fraseriana*  
Shrubs: *Adenanthos cygnorum*, *Jacksonia densiflora*, *Hibbertia hypericoides*, 3,5#*Isopogon drummondii*, *Petrophile linearis*, *Hemiandra pungens*, *Conostephium pendulum*, *Calectasia cyanea*, *Leucopogon conostephioides*, 4#*Jacksonia restioides*, *Pimelea* sp, *Eremaea pauciflora*, *Xanthorrhoea preissii*, *Stirlingia latifolia*, 3,6#*Conospermum undulatum*, *Synaphaea spinulosa*, *Gompholobium confertum*,  
Grasses: *Amphipogon turbinatus*, \**Briza maxima*  
Herbs: *Phlebocarya filifolia*, *Dasypogon bromeliifolius*, 5#*Dasypogon obliquifolius*, *Burchardia umbellata*, *Tricoryne elatior*, *Conostylis aurea*, *Conostylis setigera*, *Johnsonia pubescens*, *Macarthuria australis*, \**Ursinia anthemoides*  
Sedges: *Alexgeorgea nitens*, *Mesomelaena pseudostygia*, 5#*Cyathochaeta avenacea*, *Lepidosperma* sp, *Loxocarya fasciculata*, *Hypolaena exsulca*

**CONDITION**

Rating **Poor**

Comments: The area is of this description is fragmented by tracks and is further disturbed by timber cutting, rubbish dumping and scattered deaths of mature *Banksias*.

Aerial Photo: Run 13 5181

Soil: light grey sand over light grey sand, SR (Churchward and McArthur 1980), ?Gf7 (King and Wells 1990) Drainage: good

Aspect: gentle, SW

**Site 68d**

**mj k OF Marri and Jarrah Open Forest over *Kingia australis* High Open  
Shrubland over *Xanthorrhoea preissii* Shrubland over Low Open Heath over  
*Mesomelaena tetragona* and *Tetraria octandra* Open Sedgeland**

**COMMENTS**

This vegetation association in which this site is located, Marri and Jarrah Open Forest over *Kingia australis* is fragmented by tracks and then further severely disturbed by inappropriate 'enrichment' planting, rubbish dumping, soil disturbance and weed invasion. Weeds in the association are \**Freesia*, \**Pennisetum clandestinum*, \**Cytisus proliferus*, \**Leptospermum laevigatum* (to 70% cover), \**Eragrostis curvula*, \**Avena fatua* and \**Trifolium* species

Trees: *Eucalyptus calophylla*, *Eucalyptus marginata*, *Allocasuarina fraseriana*  
Shrubs: 4#*Kingia australis*, *Xanthorrhoea preissii*, *Dryandra nivea*, 4#*Isopogon asper*, *Petrophile macrostachya*, 4#*Gompholobium polymorphum*, 4#*Jacksonia restioides*, *Petrophile linearis*, *Gompholobium knightianum*, 4#*Acacia nervosa*, *Hemiandra pungens*, *Eriostemon spicatus*, *Calectasia ?cyanea*

Adjacent: 4#*Lambertia multiflora*

Grasses: \**Briza maxima*, *Microlaena stipoides*

Herbs: 4#*Pentapeltis peltigera*, *Anigozanthos manglesii*, *Dampiera linearis*, *Chamaescilla corymbosa*, *Patersonia occidentalis*, *Stylidium piliferum*, *Stylidium repens*, *Lyperanthus serratus*, *Drosera stolonifera*, *Thysanotus* sp, *Pronaya* sp, *Gonocarpus cordiger*, \**Gladiolus caryophyllaceus*, *Burchardia umbellata*, \**Ursinia anthemoides*

Adjacent: *Haemodorum spicatum*, *Haemodorum laxum*

Sedges: 4#*Mesomelaena tetragona*, *Tetraria octandra*, *Loxocarya fasciculata*

**CONDITION**

Rating **Good**

Comments:

Aerial Photo: Run 13 5181

Soil: brown loam with lateritic pebbles over grey brown clay, F (Churchward and McArthur 1980), ?F2 (King and Wells 1990)

Drainage: moderate

Aspect: flat

## HARTFIELD INTERIM PROTECTION AREA

extracted from Keighery, B.J. and Trudgen, M. (1992) Remnant Vegetation on the Alluvial Soils of the Eastern Side of the Swan Coastal Plain

**Location 68-** Hartfield Country Club Area, Forrestfield. Location Map 8. Vegetation Map Area 16, p95.

**Veg: b LOW, b LW, me LOW, ac/p CHt, p CHt, jab W, mj k OF** **Cond: Very Good to Completely Degraded**

### GENERAL COMMENTS

This vegetation associations at this Location, *Pericalymma ellipticum* and *Hakea sulcata* Closed Heath, *Banksia menziesii* Low Open Woodland, Jarrah, *Banksia menziesii* and *Allocasuarina fraseriana* Woodland to Open Woodland and Marri and Jarrah Open Forest over *Kingia australis* High Open Shrubland are fragmented by developments at the Location such as the Golf Course, Pony Club, clearing for parkland and track proliferation associated with these developments and the Tonkin Hwy.

The *Pericalymma ellipticum* and *Hakea sulcata* Closed Heath with rises of *Banksia menziesii* and *Allocasuarina fraseriana* Low Woodland are generally in Good to Very Good Condition and are the most extensive associations at the Location even though they are dissected by the Tonkin Hwy and partially drained. Within the *Pericalymma ellipticum* and *Hakea sulcata* Closed Heath there are two poorly defined associations, *Melaleuca* Open Low Woodland and an area with scattered *Actinostrobos*.

The remaining intact areas of vegetation are further severely disturbed by inappropriate 'enrichment' planting, rubbish dumping, soil disturbance and weed invasion. With the appropriate management these areas could be maintained.

### Site 68a: sandy clay flats

**p CH** *Pericalymma ellipticum* and *Hakea sulcata* Closed Heath over *Verticordia densiflora* Low Open Shrubland over *Leptocarpus coangustatus* Sedgeland

### COMMENTS

In places the density of *Melaleuca preissiana* increases to form an Open Low Woodland in the eastern section of this vegetation association and there is a area with a *Actinostrobos pyramidalis* Open Shrubland in a band to the east and west of the Hwy, south of the southern *Banksia* Woodland Ridge.

Trees: Adjacent: occasional *Melaleuca preissiana*

Shrubs: *Pericalymma ellipticum*, *Verticordia densiflora*, 4#*Kingia australis*, ?*Beaufortia squarrosa*, *Gompholobium reticulatum*, *Stirlingia latifolia*

Adjacent: 3,6#*Conospermum undulatum*, *Conospermum teretifolia*, *Astartea fascicularis*, *Hypocalymma angustifolium*

Herbs: *Stylidium brunonianum*, *Patersonia* aff *umbrosa*, *Haemodorum laxum*

Sedges: *Leptocarpus coangustatus*, *Schoenus* sp., *Cyathochaeta avenacea*

### CONDITION

Rating **Very Good**

Comments: An adjacent drain has probably caused the area to drain more effectively than in the past which could have effects on the vegetation that is dependant on seasonal inundation

Aerial Photo: Run 135181

Soil: grey sandy clay over grey clay, SR (Churchward and McArthur 1980), ?Gf6 (King and Wells 1990)

Drainage: poor

Aspect: flat

**Site 68b: Sandy Rise**

ba W *Banksia menziesii* Low Open Woodland to Low Open Woodland over  
*Hibbertia hypericoides* and *Eremaea pauciflora* Open Shrubland over  
*Cyathochaeta avenacea* and *Mesomeleana stygia* Sedgeland

Trees: *Banksia menziesii*, *Allocasuarina fraseriana*, *Eucalyptus marginata*

Shrubs: *Adenanthos cygnorum*, 4#*Lambertia multiflora*, *Verticordia densiflora*, *Hibbertia hypericoides*, *Eremaea pauciflora*, *Bossiaea eriocarpa*, *Xanthorrhoea preissii*, *Stirlingii latifolia*, 3,6#*Conospermum undulatum*, *Synaphaea spinulosa*, *Gompholobium confertum*, *Jacksonia densiflora*, *Beaufortia squarrosa*, *Pericalymma ellipticum*

Adjacent: 4#*Kingia australis*

Herbs: *Patersonia occidentalis*, *Phlebocarya filifolia*, *Dasypogon bromeliifolius*, *Burchardia umbellata*, *Tricoryne elatior*, *Conostylis setigera*, *Conostylis aurea*, *Johnsonia pubescens*, *Scaevola paludosa*, *Lomandra hermaphrodita*

Sedges: *Schoenus* sp, *Tetraria octandra*, *Lyginia barbata*

**CONDITION**

Rating **Good to Very Good**

Comments:

Aerial Photo: Run 13 5181

Soil: grey sand over cream sand, SR (Churchward and McArthur 1980), ?Gf7 (King and Wells 1990)

Drainage: good

Aspect: top of rise, flat

**Site 68c: Sandune.** To the north west Jarrah becomes an important tree species and this association is mapped as Jarrah, *Banksia* and *Allocasuarina* Woodland

ba W *Banksia menziesii*, *Banksia attenuata* and *Allocasuarina fraseriana* Low Woodland to Low Open Forest over *Adenanthos cygnorum* High Open Shrubland over *Hibbertia hypericoides*, *Isopogon drummondii* and *Xanthorrhoea preissii* Low Open Shrubland over *Cyathochaeta avenacea* and *Mesomeleana pseudostygia* Sedgeland

Trees: *Banksia menziesii*, *Banksia attenuata*, *Allocasuarina fraseriana*

Shrubs: *Adenanthos cygnorum*, *Jacksonia densiflora*, *Hibbertia hypericoides*, 3,5#*Isopogon drummondii*, *Petrophile linearis*, *Hemiandra pungens*, *Conostephium pendulum*, *Calectasia cyanea*, *Leucopogon conostephioides*, 4#*Jacksonia restioides*, *Pimelea* sp, *Eremaea pauciflora*, *Xanthorrhoea preissii*, *Stirlingia latifolia*, 3,6#*Conospermum undulatum*, *Synaphaea spinulosa*, *Gompholobium confertum*,

Grasses: *Amphipogon turbinatus*, \**Briza maxima*

Herbs: *Phlebocarya filifolia*, *Dasypogon bromeliifolius*, 5#*Dasypogon obliquifolius*, *Burchardia umbellata*, *Tricoryne elatior*, *Conostylis aurea*, *Conostylis setigera*, *Johnsonia pubescens*, *Macarthuria australis*, \**Ursinia anthemoides*

Sedges: *Alexgeorgea nitens*, *Mesomelaena pseudostygia*, 5#*Cyathochaeta avenacea*, *Lepidosperma* sp, *Loxocarya fasciculata*, *Hypolaena exsulca*

**CONDITION**

Rating **Poor**

Comments: The area is of this description is fragmented by tracks and is further disturbed by timber cutting, rubbish dumping and scattered deaths of mature *Banksias*.

Aerial Photo: Run 13 5181

Soil: light grey sand over light grey sand, SR (Churchward and McArthur 1980), ?Gf7 (King and Wells 1990) Drainage: good

Aspect: gentle, SW

Site 68d  
mj k OF

Marri and Jarrah Open Forest over *Kingia australis* High Open Shrubland over *Xanthorrhoea preissii* Shrubland over Low Open Heath over *Mesomelaena tetragona* and *Tetraria octandra* Open Sedgeland

#### COMMENTS

This vegetation association in which this site is located, Marri and Jarrah Open Forest over *Kingia australis* is fragmented by tracks and then further severely disturbed by inappropriate 'enrichment' planting, rubbish dumping, soil disturbance and weed invasion. Weeds in the association are \**Freesia*, \**Pennisetum clandestinum*, \**Cytisus prolifera*, \**Leptospermum laevigatum* (to 70% cover), \**Eragrostis curvula*, \**Avena fatua* and \**Trifolium* species

Trees: *Eucalyptus calophylla*, *Eucalyptus marginata*, *Allocasuarina fraseriana*

Shrubs: 4#*Kingia australis*, *Xanthorrhoea preissii*, *Dryandra nivea*, 4#*Isopogon asper*, *Petrophile macrostachya*, 4#*Gompholobium polymorphum*, 4#*Jacksonia restioides*, *Petrophile linearis*, *Gompholobium knightianum*, 4#*Acacia nervosa*, *Hemiandra pungens*, *Eriostemon spicatus*, *Calectasia ?cyanea*

Adjacent: 4#*Lambertia multiflora*

Grasses: \**Briza maxima*, *Microlaena stipoides*

Herbs: 4#*Pentapeltis peltigera*, *Anigozanthos manglesii*, *Dampiera linearis*, *Chamaescilla corymbosa*, *Patersonia occidentalis*, *Stylidium piliferum*, *Stylidium repens*, *Lyperanthus serratus*, *Drosera stolonifera*, *Thysanotus* sp, *Pronaya* sp, *Gonocarpus cordiger*, \**Gladiolus caryophyllaceus*, *Burchardia umbellata*, \**Ursinia anthemoides*

Adjacent: *Haemodorum spicata*, *Haemodorum laxum*

Sedges: 4#*Mesomelaena tetragona*, *Tetraria octandra*, *Loxocarya fasciculata*

#### CONDITION

Rating: Good

Comments:

Aerial Photo: Run 13 5181

Soil: brown loam with lateritic pebbles over grey brown clay, F (Churchward and McArthur 1980), ?F2 (King and Wells 1990)

Drainage: moderate

Aspect: flat

To Bronwen

W I T H   O U R   C O M P L I M E N T S

Attached is a list of additional plant species recorded at Marfield Park. The survey was conducted on the 2 November 1996 and added a further 66 species to the list. This makes a total of 297 plant species recorded at the Park.

*John Newson*



**SHIRE OF  
KALAMUNDA**  
• A HOME IN THE FOREST •

2 Railway Road, Kalamunda  
PO Box 42, Kalamunda  
Western Australia 6076  
Telephone: (09) 293 2111  
Facsimile: (09) 293 2715

SPECIES LIST FOR HARTFIELD PARK

— From Keighery & Tredgrew 1992, DEP 1994-96, Bennett 1996, Armstrong 1999?

Species Name	Common Name
<i>Acacia alata</i>	Winged Wattle
<i>Acacia huegelii</i>	
* <i>Acacia iteaphylla</i>	
* <i>Acacia longifolia</i>	Sydney Wattle
<i>Acacia nervosa</i>	Rib Wattle
* <i>Acacia podalyriaefolia</i>	Silver Wattle
<i>Acacia pulchella</i>	Prickly Moses
<i>Acacia saligna</i>	Orange Wattle
<i>Acacia sessilis</i>	
<i>Acacia willdenowiana</i>	Grass Wattle
<i>Actinostrobos pyramidalis</i>	Swamp Cypress
<i>Adenanthos cygnorum</i>	Woolly Bush
<i>Agrostocrinum scabrum</i>	Blue Grass Lily
* <i>Aira caryophylla</i>	Silvery Hair Grass
<i>Alexgeorgea nitens</i>	Shining Cord Rush
<i>Allocasuarina fraseriana</i>	Sheoak
<i>Allocasuarina humilis</i>	Dwarf Sheoak
<i>Amphipogon turbinatus</i>	
* <i>Anagallis arvensis</i>	Pimpernel
<i>Anigozanthos humilis</i>	Cats Paw
<i>Anigozanthos manglesii</i>	Red & Green Kangaroo Paw
<i>Anigozanthos viridis</i>	Green Kangaroo Paw
<i>Aphelia brizula</i>	
<i>Astartea fascicularis</i>	
<i>Astroloma pallidum</i>	Kick Bush
<i>Astroloma stomarrhena</i>	Red Swamp Astroloma
* <i>Avena fatua</i>	Wild Oats
<i>Baeckea camphorosmae</i>	Camphor Myrtle
<i>Baeckea crispiflora</i>	
<i>Banksia attenuata</i>	Slender Banksia
<i>Banksia grandis</i>	Bull Banksia
<i>Banksia ilicifolia</i>	Holly Leaved Banksia
<i>Banksia menziesii</i>	Firewood Banksia
<i>Beaufortia squarrosa</i>	Sand Bottlebrush
* <i>Bellardia trixago</i>	Bellardia
<i>Boronia ramosa</i>	Blue Boronia
<i>Bossiaea eriocarpa</i>	Common Brown Pea
* <i>Briza maxima</i>	Blowfly Grass
* <i>Briza minor</i>	Shivery Grass
<i>Brizula sp.</i>	
<i>Burchardia umbellata</i>	Milkmaids
<i>Caesia occidentalis</i>	Pale Grass Lily
<i>Caladenia flava</i>	Cowslip Orchid
<i>Calandrinia sp.</i>	

list supplied  
after meeting -  
various sources  
should be listed  
at top in plan.

## SPECIES LIST FOR HARTFIELD PARK

Species Name	Common Name
<i>Calectasia cyanea</i>	Tinsel Lily
<i>Callitris preissii</i>	Rottnest Island Pine
<i>Calothamnus hirsutus</i>	
<i>Calothamnus quadrifidus</i>	One-sided Bottlebrush
<i>Calytrix angulata</i>	Yellow Star Flower
<i>Calytrix flavescens</i>	Summer Star Flower
<i>Cassytha glabella</i>	Tangled Dodder Laurel
<i>Cassytha racemosa</i>	Dodder Laurel
<i>Cassytha sp.</i>	
<i>Centrolepis drummondiana</i>	Pointed Centrolepis
* <i>Chamelaucium uncinatum</i>	Geraldton Wax
<i>Cheilanthes austrotenuifolia</i>	Rock Fern
<i>Chorizema dicksonii</i>	Yellow-eyed Flame Pea
<i>Comesperma calymega</i>	Blue-spike Millwort
<i>Comesperma sp.</i>	
<i>Conospermum triplinervium</i>	Tree Smokebush
<i>Conospermum undulatum</i>	Smokebush
<i>Conostephium pendulum</i>	Pearl Flower
<i>Conostylis aculeata</i>	Prickly Cottonheads
<i>Conostylis aurea</i>	Golden Conostylis
<i>Conostylis juncea</i>	Cottonhead
<i>Conostylis setigera</i>	Bristly Cottonhead
<i>Conothamnus trinervis</i>	
* <i>Cortaderia selloana</i>	Pampas Grass
<i>Corymbia calophylla (prev. Eucalyptus)</i>	Marri
<i>Crassula colorata</i>	Dense Stonecrop
<i>Crassula pedicellosa</i>	Purple Stonecrop
* <i>Cyathochaeta avenacea</i>	
* <i>Cynodon dactylon</i>	Couch
* <i>Cyperus tenellus</i>	Tiny Flatsedge
* <i>Cytisus proliferus</i>	Tree Lucerne
<i>Dampiera linearis</i>	Common Dampiera
<i>Danthonia pilosa</i>	Smooth flower Wallaby Grass
<i>Darwinia citriodora</i>	Lemon-scented Darwinia
<i>Dasyopogon bromeliifolius</i>	Pineapple Bush
<i>Dasyopogon obliquifolius</i>	Pineapple Bush
<i>Daviesia decurrens</i>	Prickly Bitter Pea
<i>Daviesia horrida</i>	Prickly Bitter Pea
<i>Daviesia nudiflora</i>	
<i>Daviesia physodes</i>	
<i>Daviesia preissii</i>	
<i>Daviesia triflora</i>	
<i>Drosera erythrorhiza</i>	Red Ink Sundew
<i>Drosera gigantea</i>	Giant Sundew

## SPECIES LIST FOR HARTFIELD PARK

Species Name	Common Name
<i>Drosera glanduligera</i>	Pimpernel Sundew
<i>Drosera macrantha ssp. macrantha</i>	Bridal Sundew
<i>Drosera menziesii</i>	Pale Rainbow
<i>Drosera stolonifera</i>	Leafy Sundew
<i>Drosera zonaria</i>	Painted Sundew
<i>Dryandra armata</i>	Prickly Dryandra
<i>Dryandra lindleyana</i>	Honey Pots
<i>Dryandra sessilis</i>	Parrot Bush
* <i>Ehrharta calycina</i>	Perennial Veldt Grass
* <i>Ehrharta longiflora</i>	Annual Veldt Grass
* <i>Eragrostis curvula</i>	African Lovegrass
<i>Eremaea pauciflora</i>	
<i>Eriostemon spicatus</i>	Pepper and Salt
* <i>Erodium cicutarium</i>	Common Storksbill
<i>Eucalyptus marginata</i>	Jarra
<i>Eucalyptus todtiana</i>	Prickly Bark
* <i>Euphorbia terracina</i>	Geraldton Carnation Weed
<i>Eutaxia virgata</i>	
* <i>Freesia leichtlinii</i>	Freesia
* <i>Gladiolus caryophyllaceus</i>	Wild Gladiolus
<i>Gompholobium aristatum</i>	
<i>Gompholobium confertum</i>	Painted Lady
<i>Gompholobium knightianum</i>	
<i>Gompholobium polymorphum</i>	
<i>Gompholobium scabrum</i>	
<i>Gonocarpus cordiger</i>	
<i>Goodenia caerulea</i>	
<i>Goodenia filiformis</i>	Thread-leaved Goodenia
<i>Grevillea bipinnatifida</i>	Fuchsia Grevillea
<i>Haemodorum laxum</i>	Bloodroot
<i>Haemodorum paniculatum</i>	Mardja / Bloodroot
<i>Haemodorum sp.</i>	
<i>Haemodorum spicatum</i>	Bloodroot
<i>Hakea auriculata</i>	
<i>Hakea ceratophylla</i>	Horned Leaf Hakea
<i>Hakea conchifolia</i>	Shell-leaved Hakea
<i>Hakea incrassata</i>	Marble Hakea
<i>Hakea ruscifolia</i>	Candle Hakea
<i>Hakea stenocarpa</i>	Narrow-fruited Hakea
<i>Hakea sulcata</i>	Furrowed Hakea
<i>Hakea trifurcata</i>	Two-leaf Hakea
<i>Hakea undulata</i>	Wavy-leaved Hakea
<i>Hakea varia</i>	Variable-leaved Hakea
<i>Hemiandra pungens</i>	Snake Bush

## SPECIES LIST FOR HARTFIELD PARK

Species Name	Common Name
<i>Hibbertia aff. helianthemoides</i>	
<i>Hibbertia huegelii</i>	
<i>Hibbertia hypericoides</i>	Yellow Buttercups
<i>Hibbertia pachyrrhiza</i>	
<i>Hovea chorizemifolia</i>	Holly-leaved Hovea
<i>Hovea trisperma</i>	Common Hovea
<i>Hybanthus calycinus</i>	Native Violet
<i>Hypocalymma angustifolium</i>	White Myrtle
<i>Hypocalymma robustum</i>	Swan River Myrtle
* <i>Hypochaeris glabra</i>	Flat Weed
<i>Hypolaena exsulca</i>	
<i>Isopogon asper</i>	
<i>Isopogon divergens</i>	Spreading Cone Flower
<i>Isopogon drummondii</i>	
<i>Jacksonia densiflora</i>	Holly Pea
<i>Jacksonia floribunda</i>	
<i>Jacksonia furcellata</i>	Grey Stinkwood
<i>Jacksonia restioides</i>	
<i>Johnsonia pubescens</i>	Pipe Lily
<i>Juncus bufonius</i>	Toad Rush
<i>Juncus caespiticius</i>	Grassy Rush
<i>Juncus holoschoenus</i>	Joint Leaf Rush
<i>Juncus pallidus</i>	Pale Rush
<i>Juncus planifolius</i>	Broad Leaf Rush
<i>Kennedia prostrata</i>	Running Postman
<i>Kingia australis</i>	Pulonok
<i>Kunzea micrantha</i>	
<i>Labichea punctata</i>	Lance-leaved Labichea
<i>Lambertia multiflora ssp. darlingensis</i>	Many Flowered Honeysuckle
<i>Leschenaultia expansa</i>	
<i>Lepidosperma angustatum</i>	
<i>Lepidosperma sp. aff. tenue</i>	
<i>Leptocarpus aristatus</i>	Bearded Twine Rush
<i>Leptocarpus canus</i>	Hoary Twine Rush
<i>Leptocarpus coangustatus</i>	
* <i>Leptospermum laevigatum</i>	Coast Tea Tree
<i>Leptospermum spinescens</i>	Tea Tree
<i>Leschenaultia biloba</i>	Blue Leschenaultia
<i>Leucopogon conostephioides</i>	
<i>Levenhookia pusilla</i>	Midget Stylewort
<i>Levenhookia stipitata</i>	Pink Trumpet Stylewort
<i>Lobelia heterophylla</i>	Tufted Lobelia
* <i>Lolium rigidum</i>	Wimmera Rye Grass
<i>Lomandra hermaphrodita</i>	Mat Rush

## SPECIES LIST FOR HARTFIELD PARK

Species Name	Common Name
<i>Lomandra preissii</i>	Mat Rush
<i>Lomandra sericea</i>	
<i>Loxocarya fasciculata</i>	
<i>Loxocarya flexuosa</i>	
* <i>Lupinus cosentinii</i>	Lupin
<i>Lyginia barbata</i>	
<i>Lysinema ciliatum</i>	Curry Plant
<i>Melaleuca lateritia</i>	Robin Red Breast Bush
<i>Melaleuca leptospermoides</i>	
<i>Melaleuca pauciflora</i>	
<i>Melaleuca preissiana</i>	Moonah
<i>Melaleuca seriata</i>	
<i>Melaleuca sp.</i>	
<i>Melaleuca trichophylla</i>	
<i>Melaleuca uncinata</i>	Broombush
<i>Melaleuca viminea</i>	Mohan
<i>Mesomelaena pseudostygia</i>	Semaphore Sedge
<i>Mesomelaena tetragona</i>	Semaphore Sedge
<i>Microtis atrata</i>	Mignonette Orchid
<i>Millotia tenuifolia</i>	Soft Millotia
<i>Mitrasacme paradoxa</i>	Wiry Mitrewort
* <i>Monadenia bracteata</i>	South African Orchid
<i>Monotaxis grandiflora</i>	
<i>Myriocephalus rhizocephalus</i>	Woolly Heads
* <i>Myrsiphyllum asparagoides</i>	Bridal Creeper
<i>Nemcia capitatum</i>	Bacon & Eggs
<i>Nemcia reticulata</i>	
<i>Neurachne alopecuroidea</i>	Foxtail Mulga Grass
<i>Nuytsia floribunda</i>	Christmas Tree
* <i>Ornithopus compressus</i>	Yellow Serradella
* <i>Osteospermum clandestinum</i>	Stinking Roger
* <i>Oxalis glabra</i>	
* <i>Oxalis pes-caprae</i>	Sowersob
* <i>Parentucellia viscosa</i>	
* <i>Paspalum distichum</i>	Water Couch
<i>Patersonia occidentalis</i>	Purple Flag
<i>Patersonia rudis</i>	Hairy Flag
<i>Pelargonium hybrid</i>	
<i>Pennisetum clandestinum</i>	Kikuyu Grass
<i>Pentapeltis peltigera</i>	
<i>Pericalymma ellipticum</i>	Swamp Tea Tree
<i>Persoonia elliptica</i>	Spreading Snottygobble
<i>Persoonia saccata</i>	Snottygobble
<i>Petrophile divaricata</i>	

## SPECIES LIST FOR HARTFIELD PARK

Species Name	Common Name
<i>Petrophile linearis</i>	Pixie Mops
<i>Petrophile macrostachya</i>	
<i>Petrophile media</i>	
<i>Petrophile seminuda</i>	
<i>Petrophile striata</i>	
<i>Phlebocarya ciliata</i>	
<i>Pimelea imbricata</i>	
<i>Pimelea preissii</i>	
<i>Pimelea sp.</i>	
<i>Pimelea suaveolens</i>	Scented Banjine
<i>Pimelea sulphurea</i>	Yellow Banjine
<i>Pityrodia bartlingii</i>	Woolly Dragon
<i>Prasophyllum sp.</i>	Leek Orchid
<i>Pronaya fraseri</i>	Elegant Pronaya
<i>Pterostylis recurva</i>	Jug Orchid
<i>Pterostylis vittata</i>	Banded Greenhood
<i>Pultenaea ericifolia</i>	
<i>Pyracantha nigricans</i>	Redbeak Orchid
<i>Restio leptocarpoides</i>	
<i>Restio tremulus</i>	Quivery Cord Rush
* <i>Romulea rosea</i>	Guildford Grass
<i>Scaevola paludosa</i>	
<i>Scaevola repens</i>	Grey Scaevola
<i>Schoenus benthamii</i>	
<i>Schoenus curvifolius</i>	
<i>Schoenus elegans</i>	
<i>Schoenus grammatophyllus</i>	
<i>Schoenus rodwayanus</i>	
<i>Senecio hispidulus</i>	
* <i>Silene gallica</i>	French Catchfly
<i>Siloxerus humifusus</i>	Procumbent Siloxerus
* <i>Solanum nigrum</i>	Black Berny Nightshade
* <i>Sonchus oleraceus</i>	Common Sow Thistle
<i>Stachystemon vermicularis</i>	
<i>Stipa campylachne</i>	Spear Grass
<i>Stipa flavescens</i>	Spear Grass
<i>Stipa macalpinei</i>	Spear Grass
<i>Stipa semibarbata</i>	Bearded Spear Grass
<i>Stipa sp.</i>	
<i>Stirlingia latifolia</i>	Blue Boy
<i>Stylidium brunonianum</i>	Pink Fountain Triggerplant
<i>Stylidium calcaratum</i>	Book Triggerplant
<i>Stylidium carnosum</i>	Fleshy Leaved Triggerplant
<i>Stylidium diuroides</i>	Donkey Triggerplant

## SPECIES LIST FOR HARTFIELD PARK

Species Name	Common Name
<i>Stylidium divaricatum</i>	Daddy Long Legs
<i>Stylidium piliferum</i>	Common Butterfly Triggerplant
<i>Stylidium repens</i>	Matted Triggerplant
<i>Synaphea petiolaris</i>	
<i>Synaphea spinulosa</i>	
<i>Templetonia biloba</i>	
<i>Tetraria octandra</i>	
<i>Thomasia macrocarpa</i>	Large Fruited Thomasia
<i>Thysanotus arbuscula</i>	
<i>Thysanotus multiflorus</i>	Many-flowered Fringed Lily
<i>Thysanotus patersonii</i>	Twining Fringed Lily
<i>Thysanotus sparteus</i>	
<i>Thysanotus thyrsoides</i>	
<i>Trachymene pilosa</i>	Native Parsnip
<i>Tribonanthes australis</i>	
<i>Tribonanthes longipetala</i>	
<i>Tricoryne elatior</i>	Yellow Autumn Lily
<i>Tricoryne tenella</i>	
* <i>Trifolium campestre</i>	Hop Clover
<i>Tripterococcus brunonis</i>	Winged Stackhousia
<i>Trymalium floribundum</i>	Karri Hazel
* <i>Ursinia anthemoides</i>	Ursinia
<i>Verticordia densiflora</i>	Dense Feather flower
<i>Verticordia lindleyi</i>	
<i>Viminaria juncea</i>	Swish Bush
* <i>Vulpia sp.</i>	
* <i>Wahlenbergia capensis</i>	Cape Bluebell
<i>Wahlenbergia preissii</i>	Bluebell
<i>Waitzia gracilis</i>	
* <i>Watsonia bulbifera</i>	Bugle Lily
<i>Xanthorrhoea preissii</i>	Balga
<i>Xanthosia huegelii</i>	
<i>Xylomelum occidentale</i>	Woody Pear

RF# 320:134

RE: HARTFIELD PARK MANAGEMENT PLAN



EASTERN METROPOLITAN REGIONAL COUNCIL

Bronwyn, please see enclosed the following:

- Hartfield Park (-draft vegetation section)
- Aerial photocopy 1:5000 with overlay of original vegetation types
- Site photos P1-13, AP1-13
- Maps - Revised vegetation types
- Condition map

As discussed earlier, could you please review the draft section  
 With Compliments and supporting information and comment to me by  
 May 6, 1996. Regards Mick McCarthy

EMRC plan and provide services relating to the responsible management of day-to-day operations and future issues in the community.

Suite 2 Ascot Place  
 226 Gt Eastern Hwy  
 Belmont WA 6104  
 PO Box 234  
 Belmont WA 6104  
 Telephone: 479 4808  
 Facsimile: 277 7598

Member Councils: City of Bayswater, City of Belmont, Town of Bassendean, Shire of Mundaring, Shire of Swan  
 Printed on environmentally friendly chlorine free paper.



**Mick McCarthy**  
 B Sc (Env)  
 Environmental Officer  
 Mobile: 015 425 016  
 Pager: 480 9999 # 246091

Eastern Metropolitan  
 Regional Council  
 Suite 2 Ascot Place  
 226 Great Eastern Hwy  
 Belmont WA 6104  
 PO Box 234  
 Belmont WA 6104  
 Telephone: 479 4808  
 Facsimile: 277 7598

13/5/96

Mich

Some general comments

Vegetation

Within dense heath is an area of Melaleuca viminea Open Low Scrub A (site 3, System 6 Update) probably too small to map but maybe worthy of comment.

Flora

Are you going to comment at all? The flora is diverse (= do not have a complete list) but shows features of these Kidy Hill Shelt and some aspects Pinjarra Plain (Keighley & Trudgen 1992). In particular significant species are:

- Isopogon drummondii* Priority 3
- Lambertia multiflora* var. *darlingensis* 3

- Poa Insepa zonaria* - uncommon Metro area
- Stipa macalpenoi* - "
- Leucosticta squarrosa* - "
- Xanthorrhoea drummondii* - "

Condition

Generally Heathfield Park vegetation is very resilient to weed invasion but it cleared there are problems (of tracks, transmission lines, work associated woodworks). Also planting non local natives can lead to additional weed problems such as at the area around the lake.

Thanks for the opportunity to comment.  
Ramon Keighley

13/5/96 ..

## Regional Perspective

### References

- <sup>PEP</sup> Kerthberg & Tordge - 1992
- Gibson et al 1994  
(SIBS yet to be analysed)
- Threatened and poorly reserved communities requiring interim protection
- CARM 'Threatened ecological communities' project  
Contact: John Clyth (CARM  
Val English Woodvale)

*Shire of Kalamunda*

*Hartfield Park  
Management Plan*

*Prepared by: Mick McCarthy  
Consultant Environmental  
Officer*

*April 1996*

① The land resources of Rural Areas of the Darling Range (King & Wells, 1990) map and maps Guildford and Forrestfield units in the vicinity (public lands are excluded so the soils need to be extrapolated from adjacent lands)

This mapping is born out by the vegetation that is predominantly Forrestfield/Ridge Hill Shelf type floristically.

6460000mN

32°00'

*Harfield Park*

TONKIN

**Cardie**

EXCLUSION

EXCLUSION

EXCLUSION

EXCLUSION

EXCLUSION

Gf5

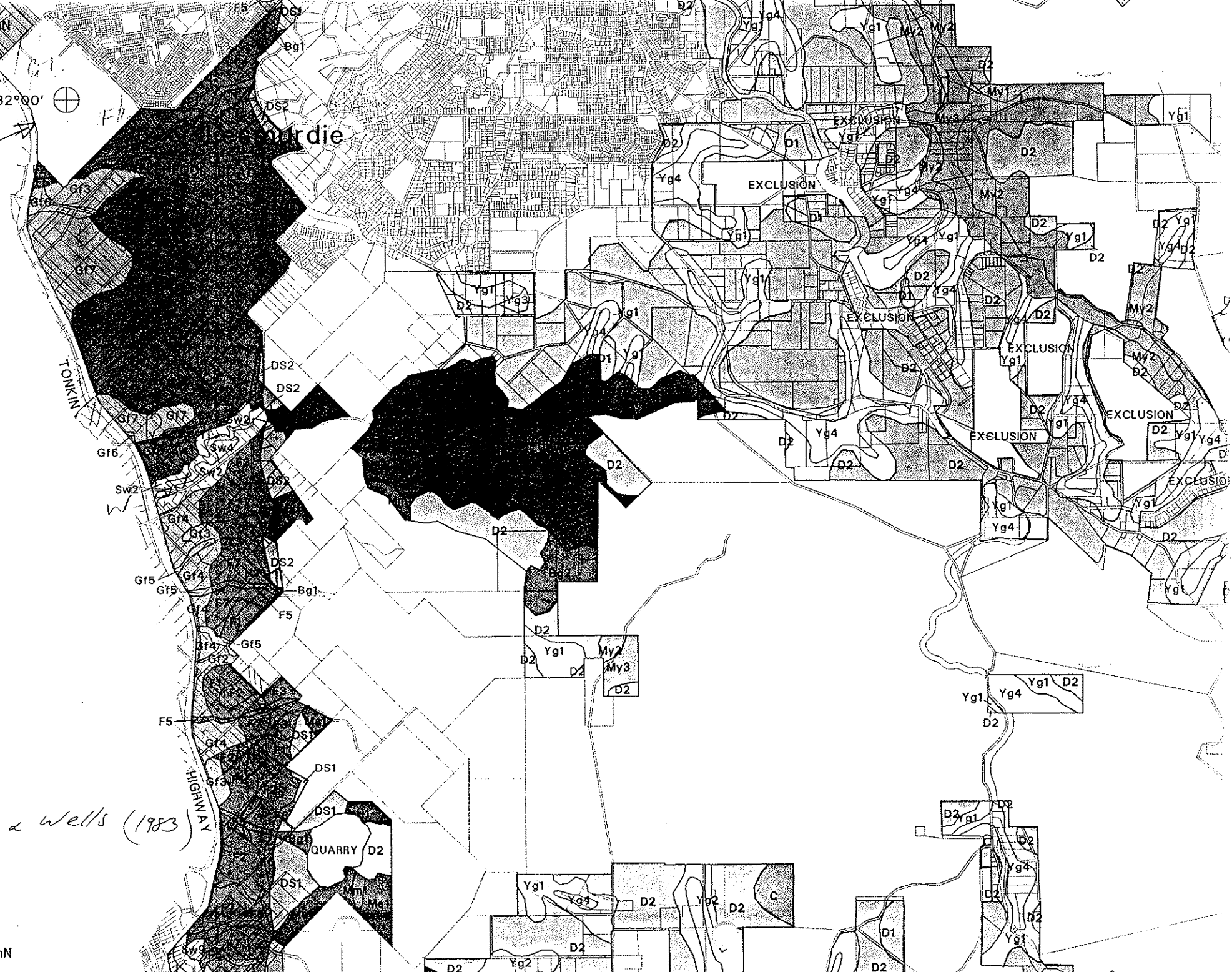
F5

QUARRY D2

*King & Wells (1983)*

HIGHWAY

6450000mN



## 2.0 THE EXISTING ENVIRONMENT

The existing environment of Hartfield Park can be broadly discussed under the following key headings.

- Landforms and Soils
- Vegetation and Flora
- Hydrology/Wetlands
- Fauna

### 2.1 Landform and Soils

Hartfield Park lies totally within the low relief Swan Coastal Plain geomorphic zone formed by alluvial and aeolian deposits.

More specifically, the park mostly corresponds to the Southern River soil unit (Churchward and McArthur, 1980) which is characterised by a sandplain with low dunes and intervening swamps. The soils are typically well drained at the surface, but may be underlain with poorly drained iron rich humus layers or clay. The drainage is generally governed by the depth of sand and has a significant influence on vegetation types. The colour of the Southern River soils ranges from light grey on the sandy rises to grey or cream at depth. The underlying clay layer in the lower relief areas is typically grey in colour.

A small section along the north eastern boundary of the park displays soil characteristics more consistent with the adjoining Forrestfield soil unit (Churchward and McArthur, 1980). The Forrestfield unit comprises the laterised foothills of the Darling Scarp and is dominated by gravelly and sandy soils. It was noted that brown soils with lateritic gravel occurred in close proximity to Hartfield Road which indicates an intrusion of this unit.

## 2.2 Vegetation and Flora

### 2.2.1 Overview

The vegetation types, at the broadest level, correspond to the soil units previously identified. The vegetation complexes (described below) are based on a regional perspective with more detailed site specific vegetation information provided in the following section.

The Southern River vegetation complex consists of an open woodland of marri (*Eucalyptus calophylla*), jarrah (*Eucalyptus marginata*), banksia (*Banksia grandis/B.attenuata*) on elevated areas. A fringing woodland of flooded gum (*Eucalyptus rudis*) and paperbark (*Melaleuca raphiophylla*) may also occur in association with streams and creeklines although these hydrological features (namely the Yule Brook) are restricted to a small section in the southern corner of the park. The remnant vegetation of the Southern River complex have considerable conservation value as almost 90% of this complex has been cleared within the Shire of Kalamunda since European settlement (Ministry for Planning, 1994). It is estimated that only 266 hectares of this complex remains in the Shire of which about 40 hectares is associated with Hartfield Park.

The Forrestfield complex, suspected to extend to the north eastern part of the park, consists of an open forest of jarrah-marri-sheoak (*Allocasuarina fraserana*) on the sandier soils with common understorey species such as the WA Christmas Tree (*Nuytsia floribunda*), blueboy (*Stirlingia latifolia*), grass tree (*Xanthorrhoea sp.*) and pink myrtle (*Hypocalymma robustum*). The Forrestfield vegetation complex has been extensively overcleared with less than 10% of its original area remaining and also possesses significant conservation value.

### 2.2.2 Site Vegetation Types

The vegetation of Hartfield Park has been surveyed on three separate occasions namely:

- Department of Conservation and Land Management (CALM) by Keighery and Trudgen (1992);
- Armstrong (1993); and
- Department of Environmental Protection (DEP) by Keighery (1995).

Eight sites identified by CALM and DEP within the park have detailed information recorded regarding vegetation associations, condition, disturbance factors and species diversity. Armstrong's survey was primarily aimed at compiling species lists for Shire reserves during the 1993/94 period.

Further assessment regarding vegetation condition outside of previously surveyed sites was also undertaken by Shire staff to gain an overall appreciation of bushland condition throughout the park. The following section details the findings of surveys undertaken to date noting key vegetation associations and their condition.

Species lists from the 1992 survey by Armstrong and the 1995 DEP survey are provided in Appendix 1.

A total of thirteen distinct vegetation associations have been identified through survey and mapped for the site. The nomenclature corresponding to each vegetation type has been simplified for easy reference, however full details of the key vegetation types and species are provided in Keighery and Trudgen (1992) and Keighery (1995). The thirteen associations using the Muir (1977) classification system are illustrated on Plan 3 and listed below with descriptions.

- Marri-Jarrah Low Forest
- Banksia Low Woodland
- Jarrah-Banksia-Sheoak Low Woodland
- Jarrah-Banksia-Sheoak Low Forest
- Dense Heath
- Banksia Open Low Woodland
- Melaleuca Open Low Woodland
- Heath with Actinostrobos
- Jarrah-Banksia Woodland
- Marri Low Woodland

- Sheoak Low Woodland
- Sheoak-Jarrah Low Woodland
- Flooded Gum-Marri Low Woodland

### 2.2.3 Marri-Jarrah Low Forest (Ap 9, P1, P2)

#### Description

The marri (*Eucalyptus calophylla*) and jarrah (*Eucalyptus marginata*) low forest occurs adjacent to the north eastern boundary of the park and has affinities with the Forrestfield vegetation complex. The marri-jarrah low forest (5-15 metres in height) has sheoak (*Allocasuarina fraserana*) and *Banksia attenuata* as a co-dominant overstorey species.

A low scrub layer (1.0-1.5 metres in height) comprises species such as <sup>①</sup>*Lambertia multiflora*, <sup>②</sup>grass trees (*Kingia australis* and *Xanthorrhoea drummondii*) and *Hakea conchifolia* with a low heath layer (0.5-1.0 metres in height) of 30-70% coverage including yellow buttercups (*Hibbertia hypercoides*), *Labiichea punctata*, *Dryandra nivea*, snake bush (*Hemiandra pungens*) and *Eriostemon spicatus*. Low sedges (under 0.5 metres in height) include *Mesomelaena tetragona*, *Mesomelaena pseudostygia* and *Loxocarya fasciculata*.

#### Weeds

Weed species include freesias, kikuyu grass (*Pennisetum clandestinum*), tree lucerne (*Cytissus prolifera*), Victorian tea tree (*Leptospermum laevigatum*), wild oats (*Avena fatua*), African love grass (*Eragrostis curvula*) and various clovers (*Trifolium sp.*).

#### Condition

Good to Very Good (see Appendix 2 for definition of vegetation condition). Plan 4 shows the condition mapping for the park based on previous and more recent surveys.

### 2.2.4 Banksia Low Woodland (Ap 5, Ap 6, P4, P5)

#### Description

The banksia low woodland surrounds Reid Oval and corresponds to a 10-30% coverage of *Banksia menziesii* and *Banksia attenuata* (5-15 metres in height) with sheoak as a co-dominant overstorey species. The understorey consists of a very sparse open scrub (greater than 2.0 metres in height) of woolly bush (*Adenanthos cygnorum*) over a low open scrub (less than 1.0 metre in height) of yellow buttercups, *Isopogon drummondii*, *Leucopogon conostephioides*, *Conostephium pendulum*, *Petrophile linearis*, *Stirlingia latifolia* and grass trees. A 30-70% coverage of low sedges are also a feature of this vegetation association and include species such as *Alexgeorgea nitens*, *Loxocarya fasuculata*, *Mesomelaena pseudostygia* and *Lepidosperma sp.*

① *Lambertia multiflora*  
var. *darlingensis*  
is restricted to  
sands to sandy  
laterites associated  
with the Forrestfield  
unit.

② *Kingias* are not  
commonly described  
as grass trees, this  
is confusing.

## Weeds

The main weed species are restricted to the disturbed areas near the natural gas pipeline and Tonkin Highway reserves and include veldt grass and African love grass. ①

## Condition

The condition is generally Very Good, although areas in proximity of disturbance (Tonkin Highway reserve, gas easement) are in Degraded to Good condition.

### 2.2.5 Jarrah-Banksia-Sheoak Low Woodland

total also has been some  
wood cutting on golf course  
side of road, numerous  
tracks & rubbish dumping

## Description

This association occurs between the Veteran Car Club and Tonkin Highway and consists of a low woodland of jarrah-banksia-sheoak and a heath understorey of woolly bush, grass trees and *Stirlingia latifolia* with *Scirpus nudosa* as a common sedge species. Western Australian Christmas trees (*Nuytsia floribunda*) are also scattered throughout this association.

## Weeds

Common weed species at the locality include veldt grass, African lovegrass and native geranium (*Pelargonium capitatum*). ②

## Condition

The jarrah-banksia-sheoak low woodland is in Good to Very Good condition although some of the areas have been highly disturbed by off-road vehicles and rubbish dumping and therefore correspond to a Degraded condition rating.

### 2.2.6 Jarrah-Banksia-Sheoak Low Forest (A10)

## Description

This association occurs within the bushland area between the Golf Club and Hartfield Road, the southern corner of the Pony Club and in a small area near the Scout Hall. It is similar to the jarrah-banksia-sheoak low woodland however the canopy cover averages 30-70% which corresponds to a low forest classification. The low scrub understorey included *Lambertia multiflora*, grass trees, *Xanthorrhoea drummondii*, and *Hakea conchifolia* with buttercups and *Labiichea punctata* comprising a low heath shrub layer and *Mesomaleana tetragona*/*M. pseudostygia* forming a sedge layer.

## Weeds

The weed species mainly occurred within the land area leased by the Pony Club where veldt grass and African love grass had become colonised from nearby heavily infested areas.

① Oval management  
impacting on  
surrounding *Cankia*  
woodland through  
invasion grass  
fertilizer & Niterditt

② See previous  
page ②

③ This is not  
a species I  
know *S. nodosa*  
is but would not  
be here. Try  
*Mesomelaena*  
*pseudostylia*.

④ This is  
not a  
native

### Condition

The golf course bushland is predominantly in Excellent condition with some weed invasion and disturbance resulting in Very Good condition around the perimeter of the bushland area. This vegetation association within the Pony Club is generally in Very Good condition and represents the area least disturbed within the lease area. The area adjacent to the Scout Hall is also in Very Good condition.

### 2.2.7 Dense Heath 15.70 153,2

#### Description

This vegetation association comprises about 20% (or 32 hectares) of the total park area and occurs throughout the lower lying flats subject to seasonal water logging. The dense heath (1.0 - 1.5 metres high) is dominated by *Pericalymma ellipticum*, *Hakea sulcata* and *Hypocalymma angustifolium* over *Verticordia densiflora*, *Gompholobium reticulatum* and *Stirlingia latifolia*. Commonly occurring sedge species include *Leptocarpus coangustatus* and *Schoenus rodwayanus* with herbs such as *Haemodorum sp.* and *Patersonia occidentalis* also featured as low understorey species. Grass trees and *Actinostrobilus pyramidalis* is also scattered throughout the heath area, although their percentage cover is very low at less than 2%.

#### Weeds

Weed infestation is generally low and associated with the disturbed areas adjacent to the highway and gas pipeline reserve. African lovegrass appears to be the main weed species, although a number of less invasive introduced grasses were noted during site inspection.

#### Condition

Over the large majority, the dense heath is in Excellent condition with the disturbed areas, which fringe the highway and gas pipeline reserve tracks, being allocated a Good or Degraded condition rating depending on level of disturbance.

### 2.2.8 Banksia Open Low Woodland

#### Description

This vegetation type has a lower percentage canopy cover, when compared to the Banksia Low Woodland surrounding Reid Oval, and is located on sandy rises adjacent and straddling Tonkin Highway. Tree species include *Banksia menziesii* with sheoak and stunted jarrah as co-dominants. The shrub layer comprises woolly bush, *Lambertia multiflora*, *Eremaea pauciflora*, *Bosiaea eriocarpa*, grass trees, *Stirlingia latifolia*, *Beaufortia squarosa* and *Pericalymma ellipticum*. The herb layer includes *Patersonia occidentalis*, *Burchardia umbellata*, *Conostylis setigera* and *Scaevola paludosa* with *Schoenus sp.*, *Tetraria octandra* and *Lyginia barbata* being the main sedges.

### Weeds

Weeds are mainly restricted to the disturbed areas adjacent to the highway with veldt grass and African love grass being the main weed species.

### Condition

The majority of this vegetation type is in Excellent to Very Good condition with the disturbed areas corresponding to a Good condition rating.

## 2.2.9 Melaleuca Open Low Woodland

### Description

The Melaleuca Open Low Woodland occurs in the south western portion of the park and is associated with wetter, lower lying palusplain areas surrounded by dense heath.

The main tree species is *Melaleuca priessiana* with scattered prickly bark (*Eucalyptus tottiana*) also occurring along the fringes of the wetter area. The closed canopy structure of individual trees tended to limit the diversity of understorey species, however it was noted that the encroachment of key heath species, such as *Pericalymma ellipticum* and *Hakea sulcata*, was common.

### Weeds

The closed nature of surrounding heath and lack of disturbance has limited the invasion of weed species, although the intrusion of pasture grasses had occurred in areas abutting grazing land along the park boundary.

### Condition

The condition of the paperbark open low woodland is generally Excellent.

## 2.2.10 Heath with Actinostrobos

### Description

The heath layer of principally *Pericalymma ellipticum* and *Beaufortia squarosa* was supported with a 1.5 - 2.0 metre high sparse coverage of *Actinostrobos pyramidalis*. This vegetation type comprised the main concentration of the *Actinostrobos* which was also scattered in small stands throughout the larger dense heath area. The lower shrubs and sedges included *Hypercalymma angustifolium*, *Verticordia densiflora*, *Leptocarpus coangustatus* and *Schoenus rodwayanus*.

### Weeds

The weed species mainly occurred in proximity to tracks and the highway reserve but were at very low densities having little impact on vegetation.

### Condition

The degree of vehicle and fire disturbance resulted in an overall vegetation condition ranging from Very Good to Excellent with a Good condition rating for areas immediately adjacent to the western edge of the highway.

#### 2.2.11 Jarrah-Banksia Woodland

### Description

The jarrah banksia woodland fringes the banksia low woodland north of Reid Oval and occurs as a distinct vegetation type between the tennis courts and the lake. The jarrah-*Banksia menziesii* woodland contains the larger mature jarrahs occurring within the park and is commonly associated with sheoaks, which tend to become more prevalent as disturbance increases.

Woolly bush, *Stirlingia latifolia* and grass trees are also a common feature of this vegetation type along with scattered *Banksia illicifolia*, *Banksia grandis* and WA Christmas trees. Yellow buttercups, *Leucopogon conostephioides*, *Petrophile linearis* are also common and occur with sedge species such as *Mesomelaena*, *Loxocarya fasciculata* and *Scirpus nodosa*.<sup>(2)</sup>

### Weeds

African lovegrass, veldt grass and introduced gums (*Eucalyptus citrodora* and *E. cladocalyx*) appear to be the main weed species requiring control.

### Condition

The condition of this vegetation type ranges from Very Good in core areas to Good around some perimeter areas.

#### 2.2.12 Marri Low Woodland <sup>(3)</sup>

### Description

The marri low woodland is located in the southern corner of the park and is adjacent to private landholdings. The area is highly disturbed with past earthworks undertaken to formalise the Yule Brook to ameliorate flooding problems experienced by nearby landholdings.

The understorey is lacking in diversity, particularly in proximity to the Yule Brook and numerous tracks traverse the area. Juvenile marris and prickly moses (*Acacia pulchella*) dominate the shrub layer with grass trees and *Pericalymma* also featuring prominently.

① Check identification  
as April 12 photo  
Shows *Xylomelum*  
*occidentale*  
rather than  
*Cank. illicitum*

② Check 10 locs;  
not expect  
this taxon

③ Creekside veg  
is very very  
rare on  
plain even  
disturbed veg.  
is significant.

## Weeds

Watsonia is a major species within this vegetation type and in some places completely dominates native vegetation species. Veldt grass is also a common weed requiring control.

## Condition

The vegetation condition may be generally described as Good, although it is recognised that isolated patches of heavily weed infested areas are 'Degraded' and require rehabilitation.

### 2.2.13 Sheoak Low Woodland

#### Description

The sheoak (*Allocasuarina fraserana*) low woodland is bounded by the golf course, lake and Morrison Oval. The 10-30% canopy cover of sheoak is supported with an occasional jarrah and WA Christmas tree as overstorey species. Woolly bush is the most common shrub species with prickly moses, *Eriostemon spicatus*, *Conostylis sp.* and young grass trees also featuring prominently.

#### Weeds

Weed species include African lovegrass, Victorian tea tree (*Leptospermum laevigatum*) and Cootamundra Wattle (*Acacia baileyana*). In many places within this vegetation type these weed species dominate native species.

#### Condition

The vegetation condition may be described as good (around perimeter and in heavily infested weed areas) to very good within the internal areas.

### 2.2.14 Sheoak-Jarrah Low Woodland

#### Description

This vegetation type is adjacent to and Pony Club and is differentiated from other similar vegetation types due to the dominance of sheoak and jarrah as the principle tree species. The jarrah was mainly stunted and displayed signs of dieback. The relatively low percentage canopy cover (10-30%), high degree of disturbance and limited extent of understorey species resulted in a low diversity for this vegetation type. Woolly bush, grass trees, *Stirlingia latifolia* and *Scirpus nodosa* were the main understorey species.

#### Weeds

African lovegrass is the major weed species and is having an adverse impact on the natural colonisation of native species.

① Have one  
deliberate  
"enrichment"  
plantings in  
this area  
that need to  
be removed.

① Too many  
trucks? used  
by horses?

Condition ①

The sheoak-jarrah low woodland is generally in Good to Very Good condition but at risk of becoming poorer condition due to weed infestation from Degraded condition areas adjacent to the Pony Club arena.

#### 2.2.15 Flooded Gum-Marri Low Woodland

Description

This vegetation type is restricted to a small area adjacent to Yule Brook in the southern corner of the park. The flooded gums (*Eucalyptus rudis*) occur as a co-dominant tree species with the marri and extend beyond the park boundary. Young paperbarks (*Melaleuca priessiana*) comprise an understorey which becomes more developed into a low open woodland outside the park area near Tonkin Highway. The understorey is generally similar to that described for the surrounding marri low woodland, although it is worthy to note the occurrence of *Acacia* sp. as a key shrub species.

Weeds

Watsonia is the main weed species affecting the flooded gum-marri low woodland and is a priority for management.

Condition

The condition of this vegetation type is generally Good, but is likely to improve under a weed control program.

### 3.0 WATERCOURSES AND WETLANDS

There are distinct relationships between the soils, vegetation and wetlands occurring throughout Hartfield Park. The main wetland types are shown on Plan 5 and described below under the headings of watercourses and wetlands.

#### 3.1 Watercourses

The dominant watercourse feature associated with Hartfield Park is the Yule Brook which traverses the southern corner of the park. Yule Brook is central to its surface water catchment which includes most of Lesmurdie, Walliston, Wattle Grove and the southern part of Forrestfield. The Yule Brook is a seasonal watercourse which incorporates the Lesmurdie Brook upstream and discharges to the Canning River down stream in the Beckenham area.

The fringing riverine vegetation associated with the Yule Brook has been extensively cleared

## Significant taxa

Merri Jarrah Forest

*Lambertia multiflora* var *darlingensis*

Banksia Low Woodland

*Tsopogon drummondii*

*Drosera zonaria* (uncommon)

*Stipa mecalperis*

*Xanthorrhoea drummondii*

*Hakea conchitoides*

*Lobelia punctata*

*Kingia pentstemonifolia*

Heath

*Beantonia squarrosa*

## Conditions

o Localised disturbance

o Banksia woodlands in Periclymenum

18 - burnt & dieback from road

o reduced species diversity

o enrich burnt plantings

Not straight fluro

descriptions left out alphabetical

sent

## ACTION PLAN

The priority strategies identified for each of the management zones have been consolidated and are presented in Table 4 including responsibilities, time frames and estimated costs. An additional category termed 'Project Management' has also been included to cover administration, organisation and staff resource costs associated with project implementation.

Table 4: Action Plan For Priority Strategies

Management Zone and Actions	Responsibility	Time Frame	Estimated Costs
<b>CONSERVATION</b>			
1. Establish Wildlife Sanctuary	Environmental Officer/Planning	97/98 and 98/99	\$50,000 (fencing)
2. Seek vesting of Gas/Water Easements	Planning	March - October 1997	-----
3. Rationalise Tracks/Restrict Access	Environmental Officer/Rangers	July-December '97	\$1,000 (bollards/pine log barriers)
4. Minimise Disturbance	Rangers	On-going	-----
5. Establish "Friends of Hartfield Park" Group	Environmental Officer/Community	February - July 1997	\$500 (media release)
6. Undertake Seed Collection	Environmental Officer/Community	Spring 96 and Spring 97	-----
7. Undertake Flora/Fauna and Dieback Surveys	Environmental Officer/Community	Spring 96 and Spring 97 -	-----
<b>CONSERVATION/PASSIVE RECREATION</b>			
1. Rationalise Tracks/Restrict Access	Environmental Officer/Rangers	July-December 97	\$1,000 (pine log barriers)
2. Control Major Weed Species	Parks and Recreation	Spring 96	Recurrent Budget
3. Revegetate Degraded Areas	Environmental Officer/Community	Autumn and Winter 97	\$1,000 (native seeds) \$500 (tubestock)
<b>ACTIVE RECREATION</b>			
1. Review Irrigation/Fertiliser Practices	Environmental Officer/Parks and Recreation	January - March 97	-----
2. Educate Sporting Groups Community	Environmental Officer/Hartfield Park Advisory Committee	On-going	-----
<b>REHABILITATION</b>			
1. Undertake Controlled Burns	Rangers	Autumn 97	Recurrent Budget
2. Undertake Weed Control	Parks and Recreation	Spring 97	Recurrent Budget
3. Follow-up Weed Control	Parks and Recreation	Summer 97 and Spring 98	Recurrent Budget
4. Replant with Overstorey Species	Environmental Officer/Parks and Recreation	Autumn and Winter 98	\$1,000 (tubestock)
<b>PROJECT MANAGEMENT</b>			
Administration, Organisation and Staff Resources	Executive Manager, Planning and Development Services	On-going	\$5,000

## **Management Zoning**

To assist in determining the most appropriate management approach for the areas throughout Hartfield Park, it is proposed to designate management zones (see Figure 9) with corresponding objectives and strategy priorities.

The four zones proposed for the park include:

- Conservation
- Conservation/Recreation
- Active Recreation
- Rehabilitation

### **Conservation**

#### *Objective*

To conserve and protect the natural values and ensure that flora and fauna populations are maintained for the benefit of existing and future generations.

#### *Rationale*

These areas are generally in very good to excellent condition and require active management (fencing, restricting access) to retain their conservation values and maintain the condition of the bushland.

#### *Priority Strategies*

1. Establish a fenced Wildlife Sanctuary for the bushland area southwest of Tonkin Highway.
2. Seek vesting of gas and water easements north east of Tonkin Highway from the respective agencies to the Shire of Kalamunda.
3. Rationalise unnecessary tracks and restrict access to designated areas. Prohibit unauthorised access.
4. Minimise disturbance to bushland from adjacent areas.
5. Establish a "Friends of Hartfield Park" community group to assist with bushland management.
6. Undertake seed collection within the park on an annual basis and establish a seed store for revegetation works.
7. Undertake flora, fauna and dieback surveys with the assistance of government agencies and community groups.

## **Conservation/Recreation**

### *Objective*

To achieve the conservation objective described in 4.2.1 whilst planning and managing recreation activities on a sustainable basis.

### *Rationale*

These areas are generally in good to very good condition and are subject to disturbance of a passive nature due to their proximity to active recreation areas and extent of weed invasion. Management strategies will need to focus on managing disturbance/access, weed control and retaining bushland condition as a buffer to key conservation areas.

### *Priority Strategies*

1. Rationalise unnecessary tracks to enable passive recreation activities and erect barriers to control access and direct users to active recreation areas.
2. Undertake control strategies for major weed species identified in this management plan whilst ensuring conservation values are maintained.
3. Revegetate degraded areas with native species sourced from locally collected native collected seed.

## **Active Recreation**

### *Objective*

To enable active recreation to continue in existing areas designated for that purpose, whilst minimising the impact of such activities on surrounding bushland areas.

### *Rationale*

The ovals, clubrooms, recreation centre, tennis courts, bowling club, pony club, golf club and vintage car club are important recreational amenities for the local and wider community. However, the facilities and activities associated with these active recreational pursuits should be undertaken in a manner that does not compromise the natural values of the park.

### *Priority Strategies*

1. Review existing irrigation and fertiliser practices for the ovals and golf course with the aim of reducing the impact of over-application on adjacent bushland areas.

2. Educate sporting associations, clubs and the community on the conservation values and newly proposed management approach for the bushland areas of Hartfield Park.

## **Rehabilitation**

### *Objective*

To progressively rehabilitate degraded bushland areas using appropriate weed control and revegetation methods to achieve a sustainable cover of native vegetation.

### *Rationale*

Several areas throughout the park require an integrated approach to address processes threatening site and adjacent vegetation condition. It is important that these areas are brought under a structured weed/fire and revegetation program to arrest further degradation.

### *Priority Strategies*

1. Undertake controlled burns in autumn or early winter 1997 to remove *Watsonia* stubble and control newly formed bulbs.
2. Undertake intensive spraying and spot spraying of emerging bulbs in spring 1997.
3. Undertake follow-up spot spraying in early summer during flowering.
4. Replant with native overstorey species (marri and flooded gum) in areas lacking adequate coverage or density.

# Valuation study of urban bushland at Hartfield Park, Forrestfield, Western Australia

By Coral Pepper, Laura McCann and Michael Burton

*Coral Pepper is currently a research associate with the School of Education, Murdoch University, South St, Murdoch 6150 (Email: coral.pepper@murdoch.edu.au). Dr Laura McCann, who was a lecturer at UWA when this work was completed, is an Assistant Professor with the Department of Agricultural Economics, University of Missouri, 214B Mumford Hall, Columbia, MO 65211-6200 (Email: mccannl@missouri.edu). Dr Michael Burton is Associate Professor, Agricultural and Resource Economics, University of W.A., Mockett Drive, Crawley 6907 (Email: mjburton@agric.uwa.edu.au). The study was undertaken as partial fulfilment of the degree of Master of Science in Natural Resource Management at the University of W.A. Murdoch, WA 6150, Australia.*

**Summary** Hartfield Park bushland represents a typical area of Perth urban bushland, and is identified as one site worthy of protection in the Western Australian Government's Bush Forever Plan. Two thirds of the Reserve is developed and parts of the remaining bushland are under threat of future development for parking and playing fields. This paper reports a study undertaken to estimate the economic value placed by the community on a specified urban bushland site using the contingent valuation method, a stated preference, non-market valuation technique which captures both use and non-use values. Because environmental goods such as urban bushland exist without organized markets, they are often omitted from the decision-making process regarding the socially optimal management of resources. In estimating a valuation for Hartfield Park, it may be included in any cost-benefit analysis conducted for the site in future. A survey was conducted across the Perth metropolitan area during April 2001 that involved the mail out of 1000 questionnaires to names and addresses obtained at random from the Western Australia Electoral Roll. A 54% response rate was obtained. Regression analysis was used to predict the probability of people being willing to pay for the preservation of this urban bushland and the significant predictors of willingness to pay related to income and educational levels rather than proximity to or knowledge of the site. Willingness to pay was also estimated and the results indicate a conservative mean willingness to pay for the preservation of the bushland of \$A21.60 per person per annum. Extrapolation of this figure across the total adult metropolitan community resulted in an estimated valuation of \$A16.6 million. Median willingness to pay was also estimated and equalled \$A4.35 per person per annum with a valuation for the total adult metropolitan community equal to \$A3.3 million. Extrapolation of these mean and median figures across Perth households rather than adult individuals resulted in an estimated valuation of \$A9.6 million and \$A1.9 million, respectively. These figures indicate that the community value for this environmental amenity may exceed the costs of providing alternative facilities elsewhere.

**Key words:** *contingent valuation, environmental goods, urban bushland, use and non-use values.*

## Introduction

Conserving biological diversity is regarded as one of the major environmental challenges facing the global community (Halpern 1993). Australia signed the Convention on Biological Diversity at the Rio Earth Summit in June 1992, with the implications for governments encapsulated in the *National Strategy for the Conservation of Australia's Biological Diversity* (Department of the Environment, Sport and Territories 1996). The Strategy acknowledges that biodiversity is about more than protecting nature from human impacts but is the foundation of ecologically sustainable development (The National Strategy for the Conservation of Australia's Biological Diversity 1996). In south-western Australia, loss of biodiversity and habitats through clearing, and habitat

degradation, are considered two of the most serious environmental problems (Western Australian Planning Commission 2000).

Hartfield Park is located in the greenbelt region of the foothills of the Swan Coastal Plain and is at risk of future development. The bushland, typical of that on the coastal plain, is identified as a high conservation value site worthy of protection and referred to as Bush Forever site 320 (Department of Environmental Protection 2000). The aim of our study was to estimate the value of this specific region of Perth urban bushland to ensure the economic benefits of conserving the bushland could be included in decisions regarding its future development.

The main development proposals affecting Hartfield Park relate to additional car parking facilities, road planning proposals, urban development and future recre-

facilities. Additional car parking facilities are on hold in the short term and future road works deferred for up to 10 years. However, in the future, major clearing of vegetation to permit the installation of traffic lights and an interchange is planned. A proposed residential area in the south-west portion of Hartfield Park is expected to place additional pressure on the site, as greater numbers of people are expected to access the recreational facilities (Eastern Metropolitan Regional Council Environmental Services 1997).

Almost two thirds of the reserve is developed into a variety of playing fields, carparks and a recreation centre. The remaining bushland area is used for bushwalking, photography and bird watching, which represent use values of the reserve. Non-use values can be described as

**Full document  
available  
on request**

# REMNANT VEGETATION

on the

ALLUVIAL SOILS

of the

EASTERN SIDE

of the

SWAN COASTAL PLAIN

**Full document  
available  
on request**

Prepared by

Bronwen Keighery and Malcolm Trudgen

for the Department of Conservation and Land Management. This project was funded under the National Estate Program, a Commonwealth-financed grants scheme administered by the Australian Heritage Commission (Federal Government) and the Heritage Council of Western Australia (formerly the Western Australian Heritage Committee) (State Government).

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**VEGETATION AND FLORA  
SURVEY  
OF THE  
SHIRE OF KALAMUNDA  
VESTED RESERVES**

**VOLUME 1 - REPORT  
OCTOBER 1992 TO MARCH 1993**

**PAUL ARMSTRONG RESEARCH OFFICER**

**SHIRE OF KALAMUNDA**

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VESTED RESERVES

VOLUME 2 - RESERVE SPECIES LIST

OCTOBER 1992 TO MARCH 1993

BY PAUL ARMSTRONG RESEARCH OFFICER

SHIRE OF KALAMUNDA

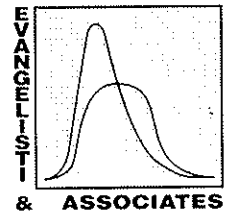
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# **WATER RESOURCES MANAGEMENT PLAN**

## **MIDDLE CANNING CATCHMENT**

(STAGE 1 - VOLUME 1)

Prepared for the

**Water Authority of Western Australia**

By

**Evangelisti & Associates**  
Consulting Engineers and Project Managers

in association with

**Landvision**  
Consultants in Urban and Environmental Planning

and

**The V & C Semeniuk Research Group**  
Environmental Scientists

October 1995



HART.....

HARTØ1 Hartfield  
Threatened and Poorly  
reserved plant  
community type  
29-9-95

HARTØ2 Hartfield  
Threatened and Poorly  
reserved plant  
community type  
29-9-95



Btn HARTØ2-Ø3  
Threatened & poorly  
reserved plant  
community type  
29-9-95





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Threatened & poorly  
reserved plant  
community type  
29-9-95

HART03 Hartfield  
Threatened & poorly  
reserved plant  
community type  
29-9-95



HART04 Hartfield  
Threatened & poorly  
reserved plant  
community type  
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