

PERTH'S BUSHPLAN





PERTH'S BUSHPLAN

VOLUME TWO
PART B

PREPARED BY



Environmental Protection Authority



WESTERN AUSTRALIAN
PLANNING COMMISSION



National Parks and
Nature Conservation Authority



WATER AND RIVERS
COMMISSION

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Part B

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Part B

BUSHPLAN SITE DESCRIPTIONS

1. Introduction

The descriptions of the Bushplan Sites are grouped according to the major landform elements on which they are located (see Part A, section 4.3.1, Landform and Soils) and their location along estuaries, rivers and creeks, namely:

2.1 DANDARAGAN PLATEAU

2.2 FOOTHILLS AND PINJARRA PLAIN

2.3 BASSENDEAN DUNES

2.4 SPEARWOOD DUNES

2.5 QUINDALUP DUNES

2.6 ESTUARIES, RIVERS AND CREEKS

Within each group the Bushplan Sites are ordered from the north to the south of the Perth Metropolitan Region. When a Site contains a series

of major landform elements the Site is grouped with the predominant major landform element found in the Site.

Each group includes a series of tables outlining the regional information categories broadly associated with the major landform element. These tables include extractions from general tables in Part A, section 4.3. The general tables in Part A from which these extractions are made are listed below alongside the tables in Part B.

Section 2.6 — Estuaries, Rivers and Creeks — only contains Tables 2 and 3 as this group traverses all the major landform elements and the general tables from Volume 2, Part A are applicable.

Specific values associated with a particular major landform element are also discussed in these introductory sections. Information on these specific values related to individual Bushplan Sites is contained in each Site description.

Part A – General Tables	Part B – Extracted Tables
Table 1: Geological and Geomorphological systems	Table 1a: Geological and Geomorphological systems
Table 2: Landform and Soils	Table 1b: Landform and Soils (modified)
Table 8: Natural Wetland Groups	Table 2: Natural Wetland Groups
Table 5: Vegetation Complexes	Table 3: Vegetation Complexes
Table 6: Floristic Community Types	Table 4: Floristic Community Types
Table 10: Threatened Ecological Communities	Table 5: Threatened Ecological Communities
Table 13: Significant Flora	Table 6: Significant Flora

2.1 DANDARAGAN PLATEAU

Part B

2.1 DANDARAGAN PLATEAU

2.1.1 INTRODUCTION

Location, Landscape and Soils

The Dandaragan Plateau lies in the north-east corner but extends well beyond the Perth Metropolitan Region. Lying to the west of the Darling Scarp, the Dandaragan Plateau is geologically part of the Swan Coastal Plain and is separated from the other major landform elements identified on the Plain by the Gingin Scarp. The Dandaragan Plateau has lower relief than the Darling Plateau and is a wedge-shaped landform of about 200 metres in elevation.

Soils are predominantly deep grey or pale brown sands with outcropping laterite areas. At times the laterites are overlaid with sand (Tables 1.1a&b). Brown or red earthy sands are found along the valleys.

While a number of different wetlands are found on the Dandaragan Plateau outside the Perth Metropolitan Region, within the Region, the wetlands are predominantly creeks (Table 2.1).

Remnant Bushland on the Dandaragan Plateau

Mapping of bushland in the Perth Metropolitan Region indicates that between 24 per cent and 40 per cent of the vegetation complexes associated with the Dandaragan Plateau (Table 3.1) remain as native vegetation. Past clearing on the Plateau has focused on the valleys where soils are most suitable for agriculture, the sandy slopes and lateritic ridges being least cleared. Recent clearing has been associated with smaller landholdings as a result of special rural subdivisions.

Plant Communities and their Conservation on the Dandaragan Plateau

At the regional level two vegetation complexes (Table 3.1) have been identified on the Dandaragan Plateau and associated Gingin Scarp in the Perth Metropolitan Region. Four floristic community types (Table 4.1, one wetland type and three upland types) are the principal regional floristic groups expected to be found on the Dandaragan Plateau in the Perth Metropolitan Region.

The main vegetation associations are Woodlands to Open Forests dominated by *Eucalyptus marginata*, *E. calophylla*, *E. wandoo* and combinations of these; *E. calophylla* Woodland to Open Forest and Low Woodlands dominated by *E. marginata*, *E. tottiana*, *Banksia attenuata* and *B. menziesii*. *Eucalyptus wandoo* is associated with the lateritic soils. These Woodlands to Open Forests are characteristically associated with a species-rich understorey (Table 4.1). There are significant differences between the species on laterites and sands (Table 4.1). The bed and banks of the watercourses support a band of wetland vegetation dominated by *Eucalyptus rudis* and *Melaleuca raphiophylla*.

Several significant taxa are known from the Dandaragan Plateau in the Perth Metropolitan Region (Table 6.1). In addition the most southern population of *Macropidia fuliginosa* is found in the region. Other taxa associated with the Plateau are also expected to be at the southern extent of their range because the most southern extent of the Dandaragan Plateau is in the Perth Metropolitan Region. Further survey work would be expected to identify such taxa.

One of the Bushplan Sites on the Dandaragan Plateau was recognised by the EPA as containing 'Threatened or Poorly Reserved Plant Communities' in need of interim protection under the System 6 part System 1 Update (EPA 1994 GIS). This site (Bushplan Site 86) was identified by Keighery, BJ, and Trudgen (1992) and occurs at the junction of the Dandaragan Plateau, Pinjarra Plain and Darling Plateau.



Table 1.1a: Geological and geomorphological systems of the Dandaragan Plateau. The general terms used in Perth's Bushplan for describing the major landform elements are in **bold italics**.

Major Geological Systems (after Playford et al., 1976)	Major Geomorphological Systems (after McArthur and Bettenay, 1960)	Detailed Geomorphological Units (after Churchward and McArthur, 1980)
Dandaragan Plateau	<i>Dandaragan Plateau</i>	Mogumber
Gingin Scarp	Gingin Scarp	Reagan

Table 1.1b: Landform and soils on the Dandaragan Plateau showing the relationship between geomorphological systems, units identified in the Environmental Geology Maps and soils described on these maps on the Swan Coastal Plain in the Perth Metropolitan Region. Column One can be used to cross-reference to groups shown in Table 1a.

Major Geomorphological Systems (after McArthur and Bettenay, 1960); * Detailed Geomorphological Units (after Churchward and McArthur, 1980)	Major Units in the Environmental Geology Maps (after various authors)	Soils associated with each unit
Dandaragan Plateau *Mogumber	Colluvial sand Laterites Leederville Formation Osborne Formation	light grey or pale brown quartz sands, gravel or laterised granite pebbles associated with clayey sand, cemented laterite, pale brown quartz and felspar sands associated with siltstone
Gingin Scarp *Reagan	Gingin Scarp	not distinguished, as above

Table 2.1: Natural Wetland Groups (Consanguineous Suites) on the Dandaragan Plateau (after Semeniuk, 1996)

Name & locations	Geomorphic setting	Primary wetlands	Stratigraphy	Origin of wetlands
Red Gully suite (DPI) 9km south of Moore River in Dandaragan Plateau	Dandaragan Plateau of gently undulating to flat surface with occasional broad gently sloping valleys alternating with incised creeks	Creeks & floodplains grading into sumplands	Quartz sand	Fluvial incision; surface runoff & depressions receiving groundwater discharge from slopes

Part B

Table 3.1: Vegetation complexes (Hedde *et al.*, 1980) and percentage remaining as native vegetation (AgWA, 1998 GIS) on the Dandaragan Plateau in the Perth Metropolitan Region

Vegetation Complex	Native Vegetation (%)
Dandaragan Plateau	
MOGUMBER COMPLEX – SOUTH: Open woodland of <i>Eucalyptus calophylla</i> , with some admixture of <i>E. marginata</i> and a second storey of <i>E. tottiana</i> – <i>Banksia attenuata</i> – <i>B. menziesii</i> – <i>B. illicifolia</i> .	40
Gingin Scarp	
REAGAN COMPLEX: Vegetation ranges from low open woodland of <i>Banksia</i> species – <i>Eucalyptus tottiana</i> to closed heath depending on the depth of soil	24

Table 4.1: Floristic community types identified on the Dandaragan Plateau (after Gibson *et al.*, 1994, and DEP, 1996)

Key

Column 1: Floristic Community Type Codes

The numbers of the types additional to Gibson *et al.* (1994) are italicised if they are subsets of an existing group (in types 19, 20, 23 and 30) and italicised and preceded by 'S' if they are supplementary groups.

Column 2: General Description of Floristic Community Types

Descriptions are based on generalised information from all plots in the group. Structural units are categorised into forest, woodlands, shrublands, sedgelands and herblands after Gibson *et al.* (1994).

Column 3: Average Species Richness per Floristic Community Type

Average species richness per 10x10m plot less those species only occurring in a single plot. Some community types can have a high proportion of single records. Thus these estimates of average species richness are underestimates in some cases.

Supergroup 1 – Foothills/Pinjara Plain

S8 *Eucalyptus wandoo* Woodlands (Scarp) 44.0

Supergroup 3 – Uplands centred on Bassendean Dunes and Dandaragan Plateau

S9 *Banksia attenuata* woodlands over dense low shrublands 38.9

S10 *Calothamnus sanguineus* dense low shrublands on sandy laterites 44.2

S18 *Eucalyptus marginata*/*E. calophylla* woodlands on laterites 35.7



Table 6.1: Significant flora of the Dandaragan Plateau in the Perth Metropolitan Region.

Key

Column 1 Taxon

Names follow Gibson et al. (1994) and Atkins (1998) unless indicated otherwise. Taxa yet to be named have an attached reference collection number from the relevant collector. An 'ms' after the name indicates that this is a manuscript name which is yet to be published.

Column 2 Major landform elements

- DS = Darling Scarp
- D = Dandaragan Plateau
- F = Foothills
- P = Piniarra Plain
- B = Bassendean Dunes
- S = Spearwood Dunes
- Q = Quindalup Dunes
- R = Estuaries, Rivers and Creeks
- int = interface of two units
- (ML) = Muchea Limestones
- (TL) = Tamala Limestones

Column 3 Taxa dependent on seasonal waterlogging or inundation

- W = depends on waterlogging or inundation of area
- W (aquatic) = depends on standing water

Column 4 Conservation status (Atkins 1998)

- R = Declared Rare Flora
- 1 = Priority 1: Poorly Known Taxa
- 2 = Priority 2: Poorly Known Taxa
- 3 = Priority 3: Poorly Known Taxa
- 4 = Priority 4: Rare Taxa

Column 5 Regional ecological preferences

- e = taxa endemic to the Swan Coastal Plain
- E = taxa endemic to the Swan Coastal Plain in the Perth Metropolitan Region

Geographical Variation

- r = populations at the northern or southern limit of their known geographic range
- d = populations disjunct from their known geographic range
- p = considered to be poorly reserved (applies to all Declared Rare Flora and Priority taxa)
- s = significant populations (applies to all Declared Rare Flora and Priority taxa)
- X = considered lost in the Perth Metropolitan Region

Taxon	Major landform element	Wetland taxa	DRF/ Priority code	Significance code
<i>Acacia anomala</i>	DS/D		R	p, s
<i>Adenanthos cygnorum</i> subsp. <i>chamaephyton</i>	D		3	p, s
<i>Astroloma macrocalyx</i>	S/F/D			s, p
<i>Astroloma microcalyx</i>	S/Q			s
<i>Banksia micrantha</i>	D		3	p, s, d
<i>Baeckea</i> sp. Chittering (R. Cranfield 1983)	D		1	p, s
<i>Verticordia serrata</i> subsp. <i>linearis</i>	D		3	p, s

DANDARAGAN PLATEAU

2.1.2 DESCRIPTIONS

Bushplan Site No.	Bushplan Map No.	System 6	Bushplan Site Name	Page No.
79	22		Polinelli Road Bushland, Bullsbrook	11
80 82 87S	22, 23		Jenkins Road North Bushland, Bullsbrook	12
87N	23		Morley Road Bushland, Bullsbrook	13
291	22, 30		Jenkins Road South Bushland, Bullsbrook	14
86	30		Burley Park and Adjacent Bushland, Bullsbrook	15

POLINELLI ROAD BUSHLAND, BULLSBROOK

Boundary Definition: bushland (part taken to cadastre) boundary (PMR boundary to north)

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 79 **Map no.** 22 **Map sheet series ref. no.** 2134-IV NW

Other Names: not known

Area (ha): total 45.5; bushland 45.5

Local Authorities (Suburb)

Zoning

Shire of Swan (Bullsbrook)

MRS: Rural

Ownership Categories

TPS: General Rural, Landscape

Private (commercial organisation)

Lot/Location/Reserve numbers (Purpose),

Street name

22, 23 Jenkins Rd

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Dandaragan Plateau/Gingin Scarp

Laterite (Ql: G2, LA1)

Foothills

Colluvial Sand (Qs: S6)

VEGETATION AND FLORA

Vegetation Complexes

Plateaus

Mogumber Complex — South (Dandaragan Plateau)

Scarps

Reagan Complex (Dandaragan Plateau)

Floristic Community Types: not sampled, types not inferred

WETLANDS

Wetland Types: creek

Natural Wetland Groups (undefined areas included in boundary)

Dandaragan Plateau

Red Gully (Dp.1)

Wetland Management Objectives: Resource Enhancement, Multiple Use

Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Not determined

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: creek, vegetated uplands

Vegetation and Flora: not field-surveyed (aerial photography interpretation only)

Structural Units

Uplands: *Eucalyptus accedens* or *E. wandoo* Woodland; *Eucalyptus marginata* Woodland to Open Forest

Wetlands: no known information

Vegetation Condition: >90% Excellent to Very Good, <10% Good to Degraded, with areas of severe localised disturbance

Total Flora: not known

Significant Flora: none recorded

Fauna: no known information

Linkage: adjacent bushland to north outside PMR; part of a regionally significant fragmented bushland/wetland linkage (Volume 2A, Map 8)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities

Opportunities and/or Constraints

Opportunities: Bushplan Site/part Bushplan Site subject to Swan and Canning Rivers EPP; under TPS

Landscape Zoning

Constraints: private land; under General Mineral Resource Area (clay)

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s).



JENKINS ROAD NORTH BUSHLAND, BULLSBROOK

Boundary Definition: bushland (part taken to cadastre)/vegetation complex (east BS87 southern portion) boundary (PMR boundary to north BS80) with unmapped bushland connection between BS80/BS82/BS87 southern portion

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 80, 82, 87 southern portion

Map no. 22, 23 **Map sheet series ref. no.** 2134-IV NW

Other Names: not known

Area (ha): total 92.9; bushland 92.5

Local Authorities (Suburb)

Zoning

Shire of Swan (Bullsbroom)

MRS: Rural

Ownership Categories

TPS: Resource, Landscape

Private (including commercial organisation)

Lot/Location/Reserve numbers (Purpose), Street name

1 Chittering Rd; 9 Jenkins Rd

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Dandaragan Plateau/Gingin Scarp

Colluvial Sand (Qs: S6)

Laterite (Ql: G2, LA1)

VEGETATION AND FLORA

Vegetation Complexes

Plateaus

Mogumber Complex — South (Dandaragan Plateau)

Floristic Community Types: *not sampled, types inferred

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau

*S9 *Banksia attenuata* woodlands over dense low shrublands

*S10 *Calothamnus sanguineus* dense low shrublands on sandy laterites

*S18 *Eucalyptus marginata*/*E. calophylla* woodlands on laterites

WETLANDS

No wetlands mapped

THREATENED ECOLOGICAL COMMUNITIES

Not assessed

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: north—south ridge with view west to Swan Coastal Plain, vegetated uplands

Vegetation and Flora: limited survey (DEP 1998, surveyed from roadside)

Structural Units

Uplands: *Eucalyptus marginata* subsp. *thalassica* Woodland to Open Woodland; *Eucalyptus calophylla* Woodland; *Eucalyptus calophylla* and *E. marginata* subsp. *thalassica* over *Banksia menziesii* and *B. attenuata* Low Woodland; *Dryandra sessilis* var. *sessilis* Closed Scrub; Open Low Heath (sometimes with overstorey) dominated by *Lambertia multiflora* var. *darlingensis*, *Xanthorrhoea preissii*, *Allocasuarina humilis*, *Scholtzia involocrata*

Vegetation Condition: >90% Pristine to Excellent, <10% Good to Degraded, with areas of severe localised disturbance associated with tracks

Total Flora: not known but variety of communities associated with species-rich shrublands

Significant Flora: *Lambertia multiflora* var. *darlingensis* (3), *Adenanthos cygnorum* subsp. *chamaephyton* (3), *Banksia micrantha* (3), *Verticordia serrata* subsp. *linearis* (3); adjacent populations of *Adenanthos cygnorum* subsp. *chamaephyton* and *Adenanthos cygnorum* subsp. *cygnorum*

Fauna: no known information

Linkage: adjacent bushland to the east and then north outside the PMR (to BS87 northern portion) and south (BS291); part of a regionally significant fragmented bushland/wetland linkage (Volume 2A, Map 8)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Diversity, Rarity

Opportunities and/or Constraints

Opportunities: Bushplan Site/part Bushplan Site subject to Swan and Canning Rivers EPP; under TPS Landscape Zoning

Constraints: private land; under Priority and General Mineral Resource Area (clay), mining tenement (Midland Brick Pty Ltd) for clay

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s).

MORLEY ROAD BUSHLAND, BULLSBROOK

Boundary Definition: bushland/vegetation complex boundary (PMR boundary to north)

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 87 northern portion **Map no.** 22, 23 **Map sheet series ref. no.** 2134-IV NW

Other Names: not known

Area (ha): total 22.9; bushland 22.9

Local Authorities (Suburb)

Zoning

Shire of Swan (Bullsbrook)

MRS: Rural

TPS: Resource

Ownership Categories

Lot/Location/Reserve numbers (Purpose),

Private (commercial organisation)

Street name

1 Chittering Rd

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Dandaragan Plateau/Gingin Scarp

Colluvial Sand (Qs: S6)

Laterite (Ql: G2, LA1)

Quartz Mica-schist (Alb: Cm1)

VEGETATION AND FLORA

Vegetation Complexes

Plateaus

Mogumber Complex — South (Dandaragan Plateau)

Floristic Community Types: *not sampled, types inferred

Supergroup 1: Foothills/Pinjarra Plain

*S8 *Eucalyptus wandoo* woodlands (Scarp)

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau

*S9 *Banksia attenuata* woodlands over dense low shrublands

*S10 *Calothamnus sanguineus* dense low shrublands on sandy laterites

*S18 *Eucalyptus marginata*/*E. calophylla* woodlands on laterites

WETLANDS

No wetlands mapped

THREATENED ECOLOGICAL COMMUNITIES

Not assessed

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated uplands

Vegetation and Flora: limited survey (DEP 1998, surveyed from roadside)

Structural Units

Uplands: *Eucalyptus accedens* Woodland; *Eucalyptus marginata* subsp. *thalassica* Woodland to Open Forest over Open Low Heath (sometimes with overstorey) dominated by *Lambertia multiflora* var. *darlingensis*, *Xanthorrhoea acanthostachya*, *Kingia australis*

Vegetation Condition: >90% Pristine to Excellent, <10% Good to Degraded, with areas of severe localised disturbance associated with tracks

Total Flora: not known but variety of communities associated with species-rich shrublands

Significant Flora: *Stylidium carlquistii* (1), *Lambertia multiflora* var. *darlingensis* (3), *Banksia micrantha* (3); *Macropidia fuliginosa* (most southern population), *Xanthorrhoea acanthostachya*

Fauna: no known information

Linkage: adjacent bushland to the east and then south outside the PMR (to BS87 southern portion); part of fragmented and contiguous bushland/wetland linkage (Volume 2A, Map 8)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Diversity, Rarity

Opportunities and/or Constraints

Opportunities: Bushplan Site/part Bushplan Site subject to Swan and Canning Rivers EPP



Constraints: private land; under Priority Mineral Resource Area (clay), mining tenement (Midland Brick Pty Ltd) for clay

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s).

JENKINS ROAD SOUTH BUSHLAND, BULLSBROOK

Boundary Definition: management/bushland (part taken to cadastre)/bushland group boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 291 **Map no.** 22, 30 **Map sheet series ref. no.** 2134-IV NW, 2134-IV SW

Other Names: not known

Local Authorities (Suburb)

Shire of Swan (Bullsbrook)

Area (ha): total 325.4; bushland 320.6

Zoning

MRS: Rural

TPS: General Rural, Landscape, Rural Residential

Lot/Location/Reserve numbers (Purpose),

Street name

21, 22, 23, 40, 111 Morrissey Rd; 10, 11, 24, 80, 81

Jenkins Rd; 241 Friars Knoll Ct; 8 Wandena Rd; 57

Hornet Cove; M1154 Ashmere Dr; 7, 40, 41, 7440 street

not identified

Crown Reserve

Ownership Categories

Private (including commercial organisation), Not identified

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Dandaragan Plateau/Gingin Scarp

Laterite (Ql: G2, LA1)

Foothills

Colluvial Sand (Qs: S6)

VEGETATION AND FLORA

Vegetation Complexes

Plateaus

Mogumber Complex — South (Dandaragan Plateau)

Scarps

Reagan Complex (Gingin Scarp, Dandaragan Plateau)

Floristic Community Types: *not sampled, types inferred

Supergroup 1: Foothills/Pinjarra Plain

*S8 *Eucalyptus wandoo* woodlands (Scarp)

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau

*S9 *Banksia attenuata* woodlands over dense low shrublands

*S10 *Calothamnus sanguineus* dense low shrublands on sandy laterites

*S18 *Eucalyptus marginata*/*E. calophylla* woodlands on laterites

WETLANDS

No wetlands mapped

THREATENED ECOLOGICAL COMMUNITIES

Not assessed

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated uplands

Vegetation and Flora: limited survey (DEP 1998, surveyed from roadside)

Structural Units

Uplands: *Eucalyptus accedens* Woodland; *Eucalyptus marginata* subsp. *thalassica* Woodland to Open Forest over Open Low Heath dominated by *Lambertia multiflora* var. *darlingensis*, *Xanthorrhoea acanthostachya*, *Kingia australia*, patches of these heaths without overstorey; *Banksia menziesii* and *B. attenuata* Low Woodland with scattered *Eucalyptus calophylla* and/or *E. marginata* subsp. *thalassica*; *E. wandoo* and/or *E. accedens* Woodland over mixed Closed Low Heath

Vegetation Condition: >80% Pristine to Excellent, <20% Very Good to Good, with areas of severe localised disturbance associated with tracks and cleared patches

Total Flora: not known but variety of communities associated with species-rich shrublands

Significant Flora: *Acacia anomala* (R); *Baeckea* sp. Chittering (RJ Cranfield 1983) (1), *Lambertia multiflora* var. *darlingensis* (3); *Xanthorrhoea acanthostachya*

Fauna: no known information

Linkage: adjacent native vegetation (condition does not warrant inclusion in the Bushplan Site) to the north (BS87 southern portion); part of a regionally significant fragmented bushland/wetland linkage (Volume 2A, Map 8)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Diversity, Rarity

Opportunities and/or Constraints

Opportunities: Bushplan Site/part Bushplan Site subject to Swan and Canning Rivers EPP; location of Declared Rare Flora; under TPS Landscape Zoning, Crown Reserve

Constraints: private land; under General Mineral Resource Area (clay)

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s).

BURLEY PARK AND ADJACENT BUSHLAND, BULLSBROOK

Boundary Definition: bushland (part taken to cadastre)/vegetation complex boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 86 **Map no. 30** **Map sheet series ref. no. 2134-IV SW**

Other Names

Pearce 6; Submission Area 314; Location 105 (Keighery, BK, and Trudgen 1992)

Area (ha): total 65.6; bushland: 65.2

Local Authorities (Suburb)

Shire of Swan (Bullsbrook)

Zoning

MRS: Rural

TPS: Landscape

Ownership Categories

Private (including commercial organisation), Local Government, State Government

Lot/Location/Reserve numbers (Purpose),

Street name

M857 Burley Rd; 2, 3 Smith Rd; 108 Dirk Rd; 0, 2, 3291 Chittering Rd
Crown Reserve

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Dandaragan Plateau/Gingin Scarp

Laterite (Ql: G2)

Foothills

Colluvial Sand (Qs: S6)

Leederville Formation (Klb: ST1)

VEGETATION AND FLORA

Vegetation Complexes

Plateaus

Mogumber Complex — South (Dandaragan Plateau, most southern occurrence)

Scarps

Reagan Complex (Dandaragan Plateau, one of two most southern occurrences)

Floristic Community Types: *not sampled, types inferred

Supergroup 1: Foothills/Pinjarra Plain

*S8 *Eucalyptus wandoo* woodlands (Scarp)

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau

*S9 *Banksia attenuata* woodlands over dense low shrublands

*S18 *Eucalyptus marginata/E. calophylla* woodlands on laterites

Supergroup 4: Uplands centred on Spearwood and Quindalup Dunes

*28 Spearwood *Banksia attenuata* or *B. attenuata* — *Eucalyptus* woodlands (eastern representation of this community type)

WETLANDS

Wetland Types: creek

Natural Wetland Groups (undefined areas included in boundary)

Darling Plateau

Walyunga (D.1)

Wetland Management Objectives: not assessed
Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Not assessed

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: very steep quartzite bluff and sand patches adjacent to a creek (small area within boundary)

Vegetation and Flora: limited survey (Keighery, BJ, and Trudgen 1992)

Structural Units: mapping (Keighery, BJ, and Trudgen 1992)

Uplands: *Eucalyptus accedens*, *E. calophylla* and *E. marginata* Open Forest to Woodland; *Allocasuarina humilis* and *Calytrix angulata* Open Heath; *Eucalyptus calophylla* and *E. marginata* Low Woodland to Low Open Forest; *Eucalyptus marginata* and *E. accedens* Woodland

Wetlands: *Eucalyptus rudis* and *E. calophylla* Woodland to Open Forest

Scattered Native Plants: adjacent canopy connection to Ki-it Monger Brook outside Bushplan Site

Vegetation Condition: >75% Excellent to Very Good, <25% Good to Degraded, with areas of severe localised disturbance

Total Flora: not known

Significant Flora: *Acacia anomala* (R); *Hakea* sp. Walyunga (L. Pen s.n.)[aff. *lasiantha*] (2), *Lambertia multiflora* var. *darlingensis* (3); *Brachysema praemorsa* (disjunct, unusual form), *Astrolooma macrocalyx*

Fauna: no known information

Linkage: no adjacent bushland; part of fragmented and contiguous bushland/wetland linkages (Volume 2A, Map 8)

Other Special Attributes: part of the Bullsbrook Bushland area recommended for inclusion in a regional park (Keighery, BJ, and Trudgen 1992); Threatened or Poorly Reserved Plant Community (EPA 1994 GIS); 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

Opportunities and/or Constraints

Opportunities: Bushplan Site/part Bushplan Site subject to Swan and Canning Rivers EPP; location of Declared Rare Flora; under TPS Landscape Zoning, Crown Reserve

Constraints: private land; under General Mineral Resource Area (clay)

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s).



Part B
BUSHPLAN SITES

2.2 FOOTHILLS AND PINJARRA PLAIN

Part B

2.2 FOOTHILLS AND PINJARRA PLAIN (Eastern Side of the Swan Coastal Plain)

2.2.1 INTRODUCTION

Location, Landscape and Soils

The Foothills and the Pinjarra Plain lie on the east of the Swan Coastal Plain and are often collectively referred to as the 'eastern side of the Swan Coastal Plain', sharing similar soils and plant communities.

The Dandaragan Plateau is also included in the eastern side of the Plain by some studies (Keighery, B), and Trudgen 1992) but for the purposes of Perth's Bushplan it is grouped separately.

The gentle slopes of the foothills are predominantly light grey colluvial quartz sands, clays and silts with intrusions of gravel which may be at the surface or at depth (Table 1.2a&b). Creeklines are characterised by clays and sandy clays.

The Pinjarra Plain is a flat plain that rises gently to the east to meet the Foothills. The alluvial soils of the Pinjarra Plain are predominantly clays and silts (Table 1.2a&b). In places, low dunes of aeolian sands from the west or colluvial sands from the east may overlay the alluvial soils. In areas of the Pinjarra Plain deposits of ironstones (bog iron ore) and limestones (Muchea Limestones) have formed. At times the different soils and the ironstones and limestones interleave. The interleaving of layers, of very different permeability, contributes to complex drainage patterns that are often not apparent at the surface (Table 2.2). The other major factor contributing to the complexity of the patterns of seasonal inundation and waterlogging is extensive surface water run-off from the Darling Plateau as most of the creeks entering the flat Pinjarra Plain form ill-defined channels on the Plain. Before the extensive drainage system was instigated early this century most of the Pinjarra Plain would have been a vast seasonal wetland extending between the Foothills and the Bassendean Dunes.

Remnant Bushland on the Eastern Side of the Plain

The eastern side of the Plain is characterised by high levels of clearing as the relatively fertile soils of the area have been selectively cleared for agriculture. In 1990 the Department of

Conservation and Land Management estimated that the eastern side of the Swan Coastal Plain was 97 per cent cleared of vegetation. In the same year, J.S. Beard estimated that there was 'no virgin vegetation left' on the eastern side of the Swan Coastal Plain. The level of clearing on the eastern side of the Plain was greater than that on the Wheatbelt which was considered to be 93 per cent cleared (Beard 1990).


More mapping for the Perth Metropolitan Region indicates that between one per cent and 18 per cent of the vegetation complexes associated with the eastern side of the Plain remain as native vegetation (Table 3.2).

Plant Communities and their Conservation on the Eastern Side of the Plain

At the regional level ten vegetation complexes (Table 3.2) are associated with the eastern side of the Plain in the Perth Metropolitan Region. Two of these complexes are associated with the Foothills and the other six with the Pinjarra Plain.

The boundaries of the vegetation complexes associated with the Foothills and the Pinjarra Plain can be used to delineate the majority of the area of the eastern side of the Plain (Table 3.2 and Volume 1, Map 2). While the Southern River contains pockets of alluvial and colluvial soils which support plant communities characteristic of the eastern side of the Plain, the majority of the area of this complex supports communities associated with the Bassendean Dunes. This is to be expected as the Southern River Complex is characterised by being in the transition between the Pinjarra Plain and the Bassendean Dunes. Bushplan Sites in the Southern River Complex are described under section 3 — Bassendean Dunes. The Cannington Complex is also associated with the transition between the Pinjarra Plain and other major landform units but is grouped here as the vegetation remaining on the Cannington Complex is more closely allied with the communities of the Pinjarra Plain.

Twenty-two floristic community types (Table 4.2, 13 wetland types and nine upland types) are the principal regional floristic groups identified on the eastern side of the Plain in the Perth Metropolitan Region.



Thirteen of the floristic community types associated with the eastern side of the Plain (Table 4.2) are considered to be threatened ecological communities (Table 5.2). Two other communities are also identified as threatened ecological communities, namely plant communities associated with Muchea Limestones and a faunal wetland ecological community. The wetland community is associated with tumulus springs.

A complex suite of vegetation associations has been identified on the eastern side of the Plain in response to changes in topography and soils, both surface and subsurface (Keighery, GJ, and Keighery 1991, 1993a, Keighery, BJ, and Trudgen 1992, Gibson *et al.* 1994, Trudgen and Keighery 1995, Keighery, BJ, 1996c, Keighery, BJ, *et al.* 1997a). The main associations are listed below.

Uplands

The uplands are associated with woodlands to open forests over a very diverse understorey, some communities having the highest species diversity on the Plain (Table 4.2). The broad units and associated dominant species are:

Open Forests and Woodlands

Eucalypts — *Eucalyptus calophylla*, *E. wandoo*, *E. marginata*, *E. lanepolei*, *E. haematoxylon*
Sheoaks — *Allocasuarina fraseriana*
Banksias — *Banksia attenuata*, *B. menziesii*, *B. prionotes*, *B. ilicifolia*, *B. grandis*
Others — *Acacia saligna*

Shrublands

Jacksonia densiflora, *Bossiaea eriocarpa*, *Daviesia triflora*, *D. nudiflora*, *D. physodes*, *Dryandra lindleyana* subsp. *lindleyana*, *Scaevola repens*, *Conostephium pendulum*, *Eriostemon spicatus*, *Gompholobium tomentosum*, *Hibbertia hypericoides*, *H. huegelii*, *Xanthorrhoea preissii*, *X. acanthostachya*, *Kingia australis*, *Acacia willdenowiana*, *A. sessilis*, *A. pulchella*

Herblands

Lomandra species, *Conostylis aurea*, *C. setigera*, *Patersonia occidentalis*, *Dampiera linearis*, *Burchardia congesta*, *Haemodorum laxum*, *Drosera* species, *Stylidium pilliferum*

Sedgeland

Mesomelaena tetragona, *M. pseudostygia*, *Tetraria octandra*, *Alexgeorgea nitens*, *Cyathochaeta clandestina*, *C. avenacea*, *Loxocarya flexuosa*

Grasslands

Austrodanthonia occidentalis, *Neurachne alopecuroidea*, *Amphipogon turbinatus*

Wetlands

The wetlands are associated with a variety of shrublands, herblands and sedgelands and, less commonly, forests. Some of the wetland communities have the highest wetland species diversity on the Plain (Table 4.2). These broad units and associated dominant species are:

Forests and Woodlands

Eucalypts — *Eucalyptus calophylla*, *E. rudis*
Sheoaks — *Casuarina obesa*
Melaleucas — *Melaleuca preissiana*, *M. raphiophylla*

Shrublands

Actinostrobos pyramidalis, *Viminaria juncea*, *Melaleuca raphiophylla* (shrub form), *M. uncinata*, *M. teretifolia*, *M. viminea*, *M. lateritia* (and *M. huegelii* on Muchea Limestones) *Astartea aff. fascicularis*, *Hypocalymma angustifolium*, *Dryandra lindleyana* subsp. *lindleyana*, *Grevillea thelemanniana*, *Hakea varia*, *H. sulcata*, *Calytrix aurea*, *Verticordia densiflora*, *Pericalymma ellipticum*, *Halosarcia indica*, *Sarcocornia quinqueflora*, *Xanthorrhoea preissii*, *Kingia australis*, *Acacia lasiocarpa* var. *bracteolata*

Herblands

Borya species, *Burchardia multiflora*, *Lomandra* species, *Patersonia occidentalis*, *Drosera* species, *Stylidium utricularioides*, *S. longitubum*, *S. calcaratum*, *Polypompholyx multifida*

Sedgeland

Schoenus rigens, *Mesomelaena tetragona*, *Cyathochaeta avenacea*, *Leptocarpus canus*, *L. aristatus*, *L. coangustatus*, a variety of annual sedges including *Centrolepis aristatus*

Grasslands

Neurachne alopecuroidea

Part B

These woodland and wetland communities are typified by large numbers of significant taxa (119 in Table 6.2). In the Perth Metropolitan Region these include six endemic taxa, 15 Declared Rare Flora and 52 Priority Flora. The communities of the eastern side of the Plain have the highest levels of species endemism on the Plain (Keighery, GJ, and Keighery 1991, 1993a, Keighery, BJ, and Trudgen 1992, Gibson *et al.* 1994, Keighery, BJ, 1996c, Keighery, BJ, *et al.* 1997) and some of the highest levels of species diversity. Many of the significant taxa (53 of the 119) and most of the endemic taxa (four of the six) are associated with species-rich wetland communities.

Communities of the eastern side of the Swan Coastal Plain are also typified by the presence of many taxa also associated with the Darling Scarp and Plateau such as *Hakea trifurcata*, *Grevillea bipinnatifida*, *G. wilsonii*, *Trymalium ledifolium*, *Diplopeltis huegelii*, *Eucalyptus lanepoolei* and *E. wandoo*. Some of these taxa, or closely related taxa, are also found on the shallow sands over outcropping Tamala Limestone. These include *Hakea trifurcata*, *Trymalium ledifolium* and *Diplopeltis huegelii*. Other taxa characteristic of the plant communities of the eastern side of the Swan Coastal Plain are also found associated with the Spearwood Dunes. The communities associated with Muchea Limestones are typified by taxa normally found in the Spearwood Dunes such as *Melaleuca huegelii*, *Eucalyptus decipiens*, *Austrostipa flavescens* and *Thysanotus arenarius* (Keighery, GJ, and Keighery 1995). At times these are represented by closely related species rather than the same taxon such as *Grevillea thelemanniana* from wetlands on the Pinjarra Plain and *Grevillea preissii* from the Tamala Limestones.

In consideration of the diversity and complexity of the plant communities of the eastern side of the Plain, and the high levels of clearing, the two most recent regional studies of the Plain (Keighery, BJ, 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. Following these two studies and further

evidence supporting the significance of remaining areas of bushland on the eastern side of the Plain, the Environmental Protection Authority recognised a number of bushland areas on the Swan Coastal Plain as being 'Threatened or Poorly Reserved Plant Communities' in need of interim protection, under the System 6 part System 1 Update (EPA 1994 GIS). While several of these areas were on geomorphic elements on the west of the Plain (see section 2.4) the majority were from the eastern side of the Swan Coastal Plain.

As a consequence of the increasing evidence for the conservation significance of the plant communities of the eastern side of the Plain and the high level of clearing, Perth's Bushplan has determined that remnant bushland on the eastern side of the Plain is in need of urgent recognition and protection. This need for recognition is encompassed in Recommendation 5.10 (Volume 1, Part 3).



Table 1.2a: Geological and geomorphological systems of the Foothills and Pinjarra Plain. The general terms used in Perth's Bushplan for describing the major landform elements are in **bold italics**.

Major Geological Systems (after Playford et al., 1976)	Major Geomorphological Systems (after McArthur and Bettenay, 1960)	Detailed Geomorphological Units (after Churchward and McArthur, 1980)
Foothills	Ridge Hill Shelf, the Foothills of the Darling and Dandaragan plateaus	Forrestfield (on foothills of the Darling Plateau) Coonambidgee (on foothills of the Dandaragan Plateau)
Guildford Formation	Pinjarra Plain	Guildford Beermullah Yanga Cannington Serpentine Swan Dardanup Cannington# Vasse#
Wetlands (within the Guildford Formation)	Not applicable	Herdsmen

Combined here under Pinjarra Plain for major landform elements, see Volume 2, Part A Tables 1 and 2

Table 1.2b: Landform and soils of the Foothills and Pinjarra Plain showing the relationship between geomorphological units, units identified in the Environmental Geology Maps and soils described on these maps on the Swan Coastal Plain in the Perth Metropolitan Region. Column One can be used to cross-reference to groups shown in Table 1a.

Major Geomorphological Systems (after McArthur and Bettenay, 1960); *Detailed Geomorphological Units (after Churchward and McArthur, 1980)	Major Units in the Environmental Geology Maps (after various authors)	Soils associated with each unit
Foothills: *Forrestfield, on foothills of the Darling Plateau; Coonambidgee (on foothills of the Dandaragan Plateau)	Colluvial deposits Colluvial sand Yoganup Formation Ridge Hill Sandstone Armadale Shales	quartz sands with differing amounts of silt, gravel and clay; light grey quartz sands and white quartz sands
Pinjarra Plain: *Guildford, Beermullah, Yanga, Serpentine, Swan, Dardanup, #Cannington, #Vasse	Guildford Formation Alluvial/colluvial deposit Alluvial/colluvial deposit (Pinjarra Plain over Ridge Hill)	clays with silts, sands and peat, also areas of ironstone at depth or surface associated with red-brown silts, and limestones associated with clays and orange sands
Wetlands – within the Pinjarra Plain, Bassendean Dunes, Spearwood Dunes, Quindalup Dunes; *Herdsmen	Holocene swamp deposits	peats associated with clays, sands and silts in various proportions

Combined here under Pinjarra Plain for major landform elements, see Volume 2, Part A Tables 1 and 2

Part B

Table 2.2: Natural Wetland Groups (Consanguineous Suites) on the Foothills and Pinjarra Plain (after Semeniuk, 1996)

Name & locations	Geomorphic setting	Primary wetlands	Stratigraphy	Origin of wetlands
Keysbrook suite (P1) Alluvial fans along the foothills of the Darling Scarp occurring south of Forrestfield Lake & continuing as far south as Brunswick Junction	Alluvial fans & creeks of the Pinjarra Plain – gently undulating plain dissected by channels	Palusplains, floodplains, creeks	Clay overlying lateritic clay & sand	Sediment discharge to develop alluvial fans; groundwater seepage; & surface runoff from the plateau & ponding of precipitation
Ellen Brook suite (R3) Ellen Brook area	Pinjarra Plain	Creek, floodplain river	Clays & sandy clays overlying laterite & sandstones	Fluvial incision; sedimentation; surface runoff
Bassendean – Pinjarra transition OR Bassendean with fluvial features				
Mungala suite (B/P2) Perth Airport surrounds including Wright Lake	Transition between Bassendean Dunes & Pinjarra Plain. Underlying stratigraphy is a complex of sands, clays, calcrete & laterite. Wetlands lie along depressions at the distributary ends of the creeks or adjacent to intermittent disconnected drainage channels	Lakes, sumplands, floodplains & creeks	Variable: clays to clay overlying quartz; sand to quartz sand overlying laterite or calcrete	Alluvial fan distributaries of creeks terminate in wetlands already present in Bassendean sandplain, bringing water & sediment
Muchea suite (B/P3) 1. Western margin of Whitfield Brook e.g. Six Mile Swamp 2. Western margin of Ellen Brook	Complex transition between Bassendean Dunes & Pinjarra Plain. Wetlands lie along the depressions at the base of Bassendean Dunes & at the headwaters of the tributaries of creeks	Sumplands & floodplains	Complex & variable pattern of quartz sand, clays, laterite & calcrete	Discharge of groundwater into basins, flats & creeks. Ponding of rainwater & groundwater occurs over impermeable sediments
Bennett Brook suite (B/P4) 1. Ballajura: In Bennett Brook area west of West Swan 2. Balannup: In Southern River area north of Forrestdale Lake 3. Yangedi: In Serpentine River area west of Serpentine township	Bassendean Dune – with microscale creeks	Sumplands creeks palusplains floodplains	Quartz sands, or clay overlying quartz sand	Depressions which intersect the water table. Precipitation is ponded by clay lenses in the sub-surface. Palusplains are situated between tributaries



Table 3.2: Vegetation complexes (Heddlé *et al.*, 1980) and percentage remaining as native vegetation (AgWA, 1998 GIS) on the Foothills and Pinjarra Plain in the Perth Metropolitan Region

Vegetation Complex	Native Vegetation (%)
Foothills (Ridge Hill Shelf)	
COONAMBIDGEE COMPLEX: Vegetation ranges from a low open forest and low woodland of <i>Eucalyptus totidiana</i> – <i>Banksia attenuata</i> – <i>B. menziesii</i> – <i>B. ilicifolia</i> with localised admixtures of <i>B. prionotes</i> to an open woodland of <i>E. calophylla</i> – <i>Banksia</i> species	7
FORRESTFIELD COMPLEX: Vegetation ranges from open forest of <i>Eucalyptus calophylla</i> – <i>E. wandoo</i> – <i>E. marginata</i> to open forest of <i>E. marginata</i> – <i>E. calophylla</i> – <i>Allocasuarina fraseriana</i> – <i>Banksia</i> species. Fringing woodland of <i>E. rudis</i> in the gullies that dissect this landform.	9
Pinjarra Plain	
GUILDFORD COMPLEX: A mixture of open forest to tall open forest of <i>Eucalyptus calophylla</i> – <i>E. wandoo</i> – <i>E. marginata</i> and woodland of <i>E. wandoo</i> (with rare occurrences of <i>E. laevis-pooletii</i>). Minor components include <i>E. rudis</i> – <i>Melaleuca raphiophylla</i> .	6
SWAN COMPLEX: Fringing woodland of <i>Eucalyptus rudis</i> – <i>Melaleuca raphiophylla</i> with localised occurrence of low open forest of <i>Casuarina obesa</i> and <i>M. articulata</i> .	11
DARDANUP COMPLEX: Mosaic of vegetation types characteristic of adjacent vegetation complexes such as Serpentine River, Southern River and Guildford.	15
SERPENTINE RIVER COMPLEX: Closed scrub of <i>Melaleuca</i> species and fringing woodland of <i>Eucalyptus rudis</i> – <i>M. raphiophylla</i> along streams.	9
BEERMULLAH COMPLEX: Mixture of low open forest of <i>Casuarina obesa</i> and open woodland of <i>Eucalyptus calophylla</i> – <i>E. wandoo</i> – <i>E. marginata</i> . Minor components include closed scrub of <i>Melaleuca</i> species and occurrence of <i>Actinostrobus pyramidalis</i> .	6
YANGA COMPLEX: Predominantly a closed scrub of <i>Melaleuca</i> species and low open forest of <i>Casuarina obesa</i> on the flats subject to inundation. On drier sites the vegetation reflects the adjacent vegetation complexes of Bassendean and Coonambidgee.	18
#CANNINGTON COMPLEX: Mosaic of vegetation from adjacent vegetation complexes of Bassendean, Karakatta, Southern River and Vasse.	1
#*VASSE COMPLEX: Mixture of the closed scrub of <i>Melaleuca</i> species fringing woodland of <i>E. rudis</i> – <i>Melaleuca</i> species and open forest of <i>E. gomphocephala</i> – <i>E. marginata</i> – <i>E. calophylla</i> .	1
# Combined here under Pinjarra Plain for major landform elements, see Volume 2, Part A Table 5	
* Also included in 2.6 ESTUARIES, RIVERS AND CREEKS	

Part B

Table 4.2: Floristic community types identified on the Foothills and Pinjarra Plain (after Gibson et al., 1994 and DEP, 1996)

Key

Column 1: Floristic Community Type Codes

The numbers of the types additional to Gibson et al. are italicised if they are subsets of an existing group (in types 19, 20, 23 and 30) and italicised and preceded by 'S' if they are supplementary groups. '#' indicates uncommon on this landform.

Column 2: General Description of Floristic Community Types

Descriptions are based on generalised information from all plots in the group. Structural units are categorised into forest, woodlands, shrublands, sedgeland and herblands after Gibson et al. (1994).

Column 3: Average Species Richness per Floristic Community Type

Average species richness per 10x10m plot less those species only occurring in a single plot. Some community types can have a high proportion of single records. Thus these estimates of average species richness are underestimates in some cases.

Supergroup 1 – Foothills/Pinjarra Plain

1a	<i>Eucalyptus haematoxylon</i> – <i>E. marginata</i> woodlands on Whicher foothills	66.2
2	Southern wet shrublands	50.3
3a	<i>Eucalyptus calophylla</i> – <i>Kingia australis</i> woodlands on heavy soils	58.2
3b	<i>Eucalyptus calophylla</i> – <i>E. marginata</i> woodlands on sandy clay soils	57.3
3c	<i>Eucalyptus calophylla</i> – <i>Xanthorrhoea preissii</i> woodlands and shrublands	47.7
#S8	<i>Eucalyptus wandoo</i> woodlands (Scarp)	44.0

Supergroup 2 – Seasonal Wetlands

5	Mixed shrub damplands	38.4
7	Herb rich saline shrublands in clay pans	44.8
8	Herb rich shrublands in clay pans	50.8
9	Dense shrublands on clay flats	34.8
10a	Shrublands on dry clay flats	45.9
11	Wet forests and woodlands	28.0
13	Deeper wetlands on heavy soils	16.9
15	Forests and woodlands of deep seasonal wetlands	16.8
S2	Northern <i>Pericalymma ellipticum</i> dense low shrublands	17.7
S5	<i>Acacia saligna</i> wetlands	23.3
S6	Northern dense low shrublands	35.4
S7	Northern woodlands to forests over tall sedgelands alongside permanent wetlands	17.7

Supergroup 3 – Uplands centred on Bassendean Dunes and Dandaragan Plateau

20a	<i>Banksia attenuata</i> woodlands over species rich dense shrublands	64.5
20b	Eastern <i>Banksia attenuata</i> and/or <i>Eucalyptus marginata</i> woodlands	59.7
20c	Eastern shrublands and woodlands	60.4
21c	Low lying <i>Banksia attenuata</i> woodlands or shrublands	38.5

Table 5.2: Threatened ecological communities (English and Blyth, 1997) on the Foothills and Pinjarra Plain

Key

- CR Critically Endangered
- EN Endangered
- VU Vulnerable

A. Floristic Community Types

Supergroup 1 – Foothills/Pinjarra Plain

2	Southern wet shrublands	EN
3a	<i>Eucalyptus calophylla</i> – <i>Kingia australis</i> woodlands on heavy soils	CR
3b	<i>Eucalyptus calophylla</i> – <i>E. marginata</i> woodlands on sandy clay soils	VU
3c	<i>Eucalyptus calophylla</i> – <i>Xanthorrhoea preissii</i> woodlands and shrublands	CR

Supergroup 2 – Seasonal Wetlands

7	Herb rich saline shrublands in clay pans	VU
8	Herb rich shrublands in clay pans	VU
9	Dense shrublands on clay flats	VU
10a	Shrublands on dry clay flats	EN
15	Forests and woodlands of deep seasonal wetlands	VU
18	Shrublands on calcareous silts	VU

Supergroup 3 – Uplands centred on Bassendean Dunes and Dandaragan Plateau

20a	<i>Banksia attenuata</i> woodlands over species rich dense shrublands	EN
20b	Eastern <i>Banksia attenuata</i> and/or <i>E. marginata</i> woodlands	EN
20c	Eastern shrublands and woodlands	CR

B: Restricted floristic community type mosaics

	Murchiea Limestones (Keighery, GJ and Keighery 1995)	CR
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C: Freshwater communities

	Communities of Tumulus Springs (Ahmat 1993, Jasinska and Knott 1994)	CR
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Part B

Table 6.2: Significant flora of the Pinjarra Plain and Foothills in the Perth Metropolitan Region

Key

Column 1: Taxon

Names follow Gibson et al. (1994) and Atkins (1998) unless indicated otherwise. Taxa yet to be named have an attached reference collection number from the relevant collector. An 'ms' after the name indicates that this is a manuscript name which is yet to be published.

Column 2: Major landform elements

- DS = Darling Scarp
- D = Dandaragan Plateau
- F = Foothills
- P = Pinjarra Plain
- B = Bassendean Dunes
- S = Spearwood Dunes
- Q = Quindalup Dunes
- R = Estuaries, Rivers and Creeks
- int = interface of two units
- (ML) = Muchea Limestones
- (TL) = Tamala Limestones

Column 3: Taxa dependent on seasonal waterlogging or inundation

- W = depends on waterlogging or inundation of area
- W (aquatic) = depends on standing water

Column 4: Conservation status (Atkins 1998)

- R = Declared Rare Flora
- 1 = Priority 1: Poorly Known Taxa
- 2 = Priority 2: Poorly Known Taxa
- 3 = Priority 3: Poorly Known Taxa
- 4 = Priority 4: Rare Taxa

Column 5: Regional ecological preferences

- e = taxa endemic to the Swan Coastal Plain
- E = taxa endemic to the Swan Coastal Plain in the Perth Metropolitan Region

Geographical Variation

- r = populations at the northern or southern limit of their known geographic range
- d = populations disjunct from their known geographic range
- p = considered to be poorly reserved (applies to all Declared Rare Flora and Priority taxa)
- s = significant populations (applies to all Declared Rare Flora and Priority taxa)
- X = considered lost in the Perth Metropolitan Region

Taxon	Major landform element	Wetland taxa	DRF/ Priority code	Significance code
<i>Acacia benthamii</i>	unknown		2	p, s, E
<i>Acacia lasiocarpa</i> var. <i>bracteolata</i> (long peduncle form)	P		1	p, s, e
<i>Actinodium cunninghamii</i>	P	W		X
<i>Actinostrobilus acuminatus</i>	F/P			p, d
<i>Allocasuarina lehmanniana</i>	Q			s
<i>Amperea protensa</i>	P	W	2	p, s
<i>Andersonia gracilis</i>	P	W	R	p, s
<i>Angianthus micropodioides</i>	P		3	p, s
<i>Anthotium juncliforme</i>	P	W	4	p, s
<i>Aotus cordifolia</i>	B/P	W	3	p, s
<i>Aponogeton hexatepalus</i>	P	W (aquatic)	4	p, s, e
<i>Aristida ramosa</i>	F		1	p, s, d



Table 6.2: (continued)

<i>Asteridea gracilis</i>	P		1	p, s, d
<i>Astroloma macrocalyx</i>	S/F/D			s, p
<i>Baekkea tenuifolia</i>	P		3	p, s, d
<i>Blancoa canescens</i>	int B/F			d, p
<i>Boronia purdieana</i>	S/B			r
<i>Burchardia bairdii</i>	int P/B	W		r
<i>Beyeria cygnorum</i>			2	p, s
<i>Byblis gigantea</i>	int B/P	W		d, p, r
<i>Caesia micrantha</i> (Large swamp form, BJK & NG 094)	P			e
<i>Calandrinia</i> sp. Kenwick (aff. <i>composita</i> , GJK 10905)	P	W	1	
<i>Calothamnus graniticus</i> subsp. <i>leptophyllus</i>	F		4	p, s
<i>Calothamnus rupestris</i>	F		4	p, s
<i>Calytrix breviseta</i> subsp. <i>breviseta</i>	P	W	R	p, s, E
<i>Centrolepis caespitosa</i>	P	W	R	p, s
<i>Chamaesalla</i> sp. Ellen Brook (GJK 12501)	P	W	3	p, s, e
<i>Comesperma rhadinocarpum</i>	P/B	W	2	p, s, d
<i>Conospermum huegelii</i>	F			s
<i>Conospermum triplinervium</i>	S/B/P			s, p
<i>Conospermum undulatum</i>	F		R	p, s, E
<i>Cyathochaeta teretifolia</i>	B/P	W	3	p, s
<i>Darwinia</i> sp. 'Muchea' (BJK 2006)	P	W		s, p
<i>Dasypogon obliquifolius</i>	F/P			d
<i>Dillwynia dillwynioides</i>	B, int B/P	W	3	p, s, e
<i>Diuris purdiei</i>	int B/P	W	R	p, s, e
<i>Drosera bulbigena</i>	P	W		e
<i>Drosera gigantea</i> subsp. <i>geniculata</i>	B/P	W		s, e
<i>Drosera macrantha</i> (Swan coastal plain form, BJK & NG 228)	P			e
<i>Drosera occidentalis</i> subsp. <i>occidentalis</i>	P	W	4	p, s
<i>Dryandra kippistiana</i>	F			d, r
<i>Dryandra mimica</i>	F		R	p, s
<i>Eleocharis keigheryi</i> (sp. Kenwick GJK 5180)	P	W	R	p, s
<i>Eremaea asterocarpa</i> subsp. <i>brachyclada</i>	F		1	p, s, e

Part B

Table 6.2: (continued)

<i>Eryngium pinnatifidum</i> subsp. <i>palustre</i> ms	P	W	2	p, s, e
<i>Eryngium subdecumbens</i> ms	P	W	1	p, s, e
<i>Eucalyptus lane poolei</i>	F			p
<i>Eucalyptus mundijongensis</i> (hybrid)	S/F		1	p, s
<i>Glischrocaryon aureum</i>	S/B/F			p
<i>Gnephosis angianthoides</i>	Riverine			d, s
<i>Grevillea althoferorum</i>	F		R	p, s, d
<i>Grevillea curviloba</i> subsp. <i>curviloba</i>	P (ML)	W	R	p, s, e
<i>Grevillea obtusifolia</i>	P	W		e, s
<i>Grevillea thelemanniana</i>	P	W	4	p, s, E
<i>Haemodorum brevisepalum</i>	P			p
<i>Haemodorum loratum</i>	F		3	p, s, d
<i>Hakea conchifolia</i>	F			s
<i>Hakea myrtoides</i>	F		3	p, s
<i>Hakea</i> sp. <i>Walyunga</i> (L. Pen sn) (aff. <i>lasiantha</i>)	R/F		2	p, s, r
<i>Haloragis aculeolata</i>	S (TL)/ P (ML)		2	p, s, e
<i>Haloragis cordiger</i>	B/P			s
<i>Haloragis tenuifolia</i>	P	W	1	p, s
<i>Hensmania turbinata</i>	B			r
<i>Hydatella dioica</i>	P	W (aquatic)	R	p, s, e
<i>Hydrocotyle lemnoides</i>	P	W (aquatic)	4	p, s
<i>Isopogon asper</i>	F/P			s
<i>Isopogon drummondii</i>	F		3	p, s, d
<i>Jacksonia gracilis</i> (previously aff. <i>sericea</i> or swamp form)	B/P			e
<i>Johnsonia</i> aff. <i>pubescens</i> (GJK 5249)	F/P			s
<i>Kunzea littoricola</i> ms	P/B	W		e
<i>Lambertia multiflora</i> var. <i>darlingensis</i>	F		3	p, s
<i>Laxmannia grandiflora</i>	F			d
<i>Lepidosperma rostratum</i>	P	W	R	p, s, E
<i>Leptocarpus</i> aff. <i>crebriculmis</i>	P			s
<i>Leptocarpus</i> sp. Forrestdale Lake	P	W		s, e

Table 6.2: (continued)

<i>Lepyrodia heleocharoides</i>	F		3	p, s
<i>Leucopogon oliganthus</i>	F			s
<i>Lomandra spartea</i>	F			r
<i>Macarthuria keigheryi</i>	F		R	p, s, d
<i>Melaleuca bracteosa</i>	P	W		d, p
<i>Myriocephalus appendiculatus</i>	P	W	3	p, s
<i>Myriocephalus helichrysoides</i>	P	W		e
<i>Myriophyllum echinatum</i>	P	W	3	X, e
<i>Nemcia dilatata</i>	F			s
<i>Olax scalariformis</i>	F/B		3	p, s, d
<i>Patersonia babingtonoides</i>	F			s
<i>Parsonsia diaphanophleba</i>	R		4	p, s
<i>Pimelea imbricata</i> var. <i>major</i>	P	W		s
<i>Pithocarpa pulchella</i> var. <i>pulchella</i>	F			p, s
<i>Pityrodia bartlingii</i>	F/P			r, d
<i>Platysace ramosissima</i>	F		3	p, s
<i>Restio stenostachyus</i>	B/P	W		e
<i>Rhodanthe pyrethrum</i>	P	W	3	p, s, e
<i>Schoenus</i> aff. <i>tenellus</i> (BJK & NG 110)	P	W		s
<i>Schoenus benthamii</i>	P	W	3	p, s
<i>Schoenus capillifolius</i>	P	W (aquatic)	2	p, s
<i>Schoenus pennisetis</i>	P	W	1	p, s
<i>Schoenus</i> sp. Bullsbrook (JJ Alford 915)	P	W	2	p, s
<i>Schoenus</i> sp. Waroona (GJ Keighery 12235)	P	W	3	p, s
<i>Stachystemon axillans</i>	F/P/B		4	p, s
<i>Stenanthemum humile</i>	F			d
<i>Stylidium longitubum</i>	P	W	3	p, s, e
<i>Stylidium mimeticum</i>	P/B	W	3	p, s
<i>Stylidium roseo</i> = <i>alatum</i>	P	W		s, p
<i>Stylidium utricularioides</i>	P	W		e
<i>Synaphea acutiloba</i>	F/P		3	p, s, e
<i>Synaphea pinnata</i>	F/P		3	p, s

Part B

Table 6.2: (continued)

<i>Tetraria australiensis</i>	F		R	e
<i>Trachymene coerulea</i>	S (TL)/P			s
<i>Trichocline</i> sp. Treeton (BJK and NG 564)	P	W	2	p, s
<i>Trichocline spathulata</i>	F/P			s
<i>Tripterococcus paniculatus</i> (sp. Cannington, AS George 16201)	B/P		1	p, s, e
<i>Verticordia lindleyi</i> subsp. <i>lindleyi</i>	P/B	W	4	p, s
<i>Verticordia nitens</i>	B/F			s
<i>Verticordia plumosa</i> var. <i>pleiobotrya</i>	P	W	R	p, s, E
<i>Villarsia submersa</i>	P	W (aquatic)	4	p, s
<i>Villarsia violifolia</i>	P/B	W (aquatic)		p, s
<i>Xanthorrhoea acanthostachya</i>	F/P			s
<i>Xanthorrhoea drummondii</i>	F/P			s

FOOTHILLS AND PINJARRA PLAIN

2.2.2 DESCRIPTIONS

Bushplan Site No.	Bushplan Map No.	System 6	Bushplan Site Name	Page No.
81	22		Wandena Road Bushland, Bullsbrook	37
2	21, 22		North East Ellen Brook Bushland, Bullsbrook	38
292	22, 30	M14	Bullsbrook Nature Reserve and Adjacent Bushland, Bullsbrook	39
100	29, 30		Neaves Road Creek, Bullsbrook	41
294	30, 36	M15	Pearce Aerodrome and Adjacent Bushland, Bullsbrook	42
89	30		Maroubra Avenue Bushland, Bullsbrook	44
88	30		Ashton Road Bushland, Bullsbrook	45
298	35		Della Road South Bushland, Bullsbrook	46
13	35		Sawpit Road Bushland, Bullsbrook	48
400	36	M17	Twin Swamps Nature Reserve and Adjacent Bushland, Bullsbrook	49
412	36		Walyunga Road Bushland, Bullsbrook	50
301	36, 42	M17	Ellenbrook Nature Reserve and Adjacent Bushland, Upper Swan	51
42	48		Toodyay Road Bushland, Red Hill	52
306	48, 53		Talbot Road Bushland, Stratton/Swan View	54
309	53		Farrall Road Bushland, Stratton	55
311	52		South Guildford Bushland, Hazelmere	56
481	53		Stirling Crescent Bushland, Hazelmere	57
213	53, 59	M34	Bushmead Bushland, Swan	58
216	53		Adelaide Crescent Bushland, Helena Valley	60
466	59		Gooseberry Hill Road Bushland, Gooseberry Hill	61
122	53		Hawkevale Bushland, High Wycombe	62
217	59		Ridge Hill Road Bushland, Gooseberry Hill	64
316	59		Maida Vale Reserve and Adjacent Bushland, Maida Vale	65
45	58, 59		Poison Gully Bushland, High Wycombe	66
123	58, 59		Sultana Road West Bushland, High Wycombe	67
319	58	M53	Dundas Road Bushland, Forrestfield	68

Part B DESCRIPTIONS

Bushplan Site No.	Bushplan Map No.	System 6	Bushplan Site Name	Page No.
440	58	M53	Pioneer Park Bushland, Forrestfield	70
282	58		Tomah Road Bushland, Wattle Grove	71
424	58, 63		McDowell Street Bushland, Welshpool	72
283	58, 63		Queens Park Bushland, Queens Park	73
456	62, 63		Nicholson Road Bushland, Langford/Thornlie	75
401	58, 59		Bougainvillea Avenue Bushland, Forrestfield	76
320	58, 59, 63, 64		Hartfield Park Bushland, Forrestfield	77
50	64		Welshpool Road Bushland, Wattle Grove	79
387	63	M69	Greater Brixton Street Wetlands, Kenwick	80
422	63		Kenwick Road Bushland, Kenwick	83
51	64		White Road Bushland, Orange Grove	84
53	64		Clifford Street Bushland, Maddington	85
124	69, 70	M76	Mary Carroll Park and Adjacent Bushland, Gosnells	86
61	70		Connell Avenue Bushland, Kelmscott	88
62	76, 77		Bob Blackburn Reserve Bushland, Armadale	89
264	77		Lambert Lane Bushland, Wungong	90
449	84		Oscar Bruns Reserve, Wungong	91
65	83		Abernethy Road Bushland, Oakford	93
350 365 375	83, 84, 90, 96		Byford to Serpentine Rail/Road Reserves and Adjacent Bushland	94
321	83, 84		Brickwood Reserve and Adjacent Bushland, Byford	96
66 271 351	83, 84		Cardup Brook Bushland, Cardup/Peel Estate	98
352	83, 90	M83	Cardup Nature Reserve and Adjacent Bushland, Cardup	100
354 361	90, 91		Norman Road Bushland, Whitby/Cardup	102
68	89		Jackson Road Bushland, Peel Estate	103
362	90		Roman Road Bushland, Whitby	105
360	89, 90, 91		Mundijong and Watkins Roads Bushland, Mundijong/Peel Estate	106
71	97		Transit Road Bushland, Jarrahdale	107

Part B DESCRIPTIONS

Bushplan Site No.	Bushplan Map No.	System 6	Bushplan Site Name	Page No.
369	94		Doghill Road Bushland, Baldivis	109
418	94		Folly Pool, Baldivis	110
419	94		Maramanup Pool, Baldivis	112
74	95, 96		Rapids Road Bushland, Peel Estate	113
277	100		River, Stakehill and Harvey Roads Bushland, Karnup	114
468	96, 102		Serpentine National Park and Adjacent Bushland, Serpentine	115
76	102	M76	Kingsbury Drive Bushland, Keysbrook	117
426	102, 106		Myara Brook Bushland, Keysbrook	118
78	106		Page Road Bushland, Keysbrook	119



WANDENA ROAD BUSHLAND, BULLSBROOK

Boundary Definition: bushland taken to cadastre boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 81

Map no. 22

Map sheet series ref. no. 2134-IV NW

Other Names

Location 112 (Keighery, BJ, and Trudgen 1992)

Area (ha): total 3.1; bushland 3.1

Local Authorities (Suburb)

Shire of Swan (Bullsbrook)

Zoning

MRS: Rural, Other Major Highways

TPS: General Rural, Landscape

Ownership Categories

Private

Lot/Location/Reserve numbers (Purpose),

Street name

6 Great Northern Hwy; 0 street not identified

SECTION 2: REGIONAL INFORMATION**LANDFORMS AND SOILS****Foothills**

Colluvial Deposits (Qc: S5)

Pinjarra Plain

Guildford Formation (Qpa: Mgs1) (Qa: Ms1)

VEGETATION AND FLORA**Vegetation Complexes****Foothills**

Coonambidge Complex (Dandaragan Plateau, most southern occurrence)

Pinjarra Plain

Beermullah Complex (most northern occurrence)

Floristic Community Types: not sampled, types not inferred

Supergroup 1: Foothills/Pinjarra Plain

Supergroup 2: Seasonal Wetlands

WETLANDS

Wetland Types: palusplain, creek

Natural Wetland Groups**Dandaragan Plateau**

Red Gully (Dp.1)

Swan Coastal Plain Rivers

Ellen Brook (R.3)

Wetland Management Objectives: Conservation (1.6ha), Resource Enhancement, Multiple Use

Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Not determined

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated wetland, creek, vegetated uplands

Vegetation and Flora: limited survey (Keighery, BJ, and Trudgen 1992, Matiske Consulting Pty. Ltd. 1997)

Structural Units

Uplands: *Eucalyptus calophylla* Woodland

Wetlands: *Melaleuca preissiana* Low Open Forest

Vegetation Condition: Very Good

Total Flora: not known

Significant Flora: Matiske Consulting Pty Ltd 1997 - *Lambertia multiflora* (most likely *L. multiflora* var. *darlingensis* (3))

Fauna: no known information

Linkage: no adjacent bushland; part of a regionally significant fragmented bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: 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, 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 conservation category wetlands; under TPS Landscape Zoning

Constraints: private land; under MRD regional road requirements

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s).

NORTH EAST ELLEN BROOK BUSHLAND, BULLSBROOK

Boundary Definition: management/bushland/conservation wetland boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 2 **Map no. 21, 22** **Map sheet series ref. no. 2034-I NE, 2134-IV NW**

Other Names

Submission Area 279, Location 110 (Keighery, BJ, and Trudgen 1992)

Local Authorities (Suburb)

Shire of Swan (Bullsbrook)

Ownership Categories

Private, State Government

Area (ha): total 51.5; bushland 50.8

Zoning

MRS: Rural

TPS: General Rural

Lot/Location/Reserve numbers (Purpose),

Street name

(creekline lots not identified)

55 Railway Rd; 36, 38, 39, 40 Great Northern Hwy; 58,

11984 street not identified

Crown Reserve

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Pinjarra Plain

Guildford Formation (Qpa: Mgs1)

Fluvial Channel with Seasonal Flow (Qpa: S11)

VEGETATION AND FLORA

Vegetation Complexes

Pinjarra Plain

Beermullah Complex (at northern limit)

Yanga Complex (in area of southern limit)

Floristic Community Types: *not sampled, type inferred

Supergroup 2: Seasonal Wetlands

5 Mixed shrub damplands

*11 Wet forests and woodlands

Supergroup 4: Uplands centred on Spearwood and Quindalup Dunes

*28 Spearwood *Banksia attenuata* or *B. attenuata* — *Eucalyptus* woodlands (eastern representation of this community type)

WETLANDS

Wetland Types: palusplain, creek

Natural Wetland Groups

Swan Coastal Plain Rivers

Ellen Brook (R.3)

Wetland Management Objectives: Conservation (25.2ha), Multiple Use

Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Not assessed

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated wetland, river (Ellen Brook), vegetated uplands

Vegetation and Flora: limited survey (DEP 1996 (Mill 01))



Structural Units

Uplands: *Banksia* Woodland

Wetlands: *Eucalyptus rudis* Closed Forest; *Melaleuca raphiophylla* Low Forest; *Melaleuca* sp. B Open Low Heath with *Actinostrobos pyramidalis* clumps; Herblands dominated by *Borya sphaerocephala* and Asteraceae species; Sedgeland dominated by *Harperia lateriflora* and mixed species

Scattered Native Plants: not assessed

Vegetation Condition: >75% Excellent to Very Good, 25% Good to Degraded, with areas of severe localised disturbance in woodland beside river

Total Flora: 36 native taxa, 12 weeds (plot-generated list, DEP 1996)

Significant Flora: *Verticordia lindleyi* subsp. *lindleyi* (4); *Burchardia bairdiae*, *Agrostocrinum scabrum* (non scabrid form, uncommon on the SCP), *Darwinia* sp. *Muchea* (BJK 2006) (uncommon taxon confined to Muchea area), *Harperia lateriflora*

Fauna: no known information

Linkage: canopy linkage to north and south along Ellen Brook; part of proposed Greenway 50 (Tingay, Alan & Associates 1997a); part of a regionally significant fragmented bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: contains plant communities representative of the eastern side of the Swan Coastal Plain; contains 1828m of regionally significant river (WRC 1996a GIS)

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 conservation category wetland; under Crown Reserve

Constraints: private land

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s).

BULLSBROOK NATURE RESERVE AND ADJACENT BUSHLAND, BULLSBROOK

Boundary Definition: protected area/conservation wetland/bushland (part taken to cadastre) boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 292 **Map no.** 22, 30 **Map sheet series ref. no.** 2134-IV NW, 2134-IV SW

System 6 (1983): M14 area of bushland goes beyond System area boundaries, all bushland described

Other Names

Location 109 (Keighery, BJ, and Trudgen 1992), part
Bushplan Site - Bullsbrook Nature Reserve

Local Authorities (Suburb)

Shire of Swan (Bullsbrook)

Area (ha): total 200.1; bushland 191.8

Zoning

MRS: Parks and Recreation Restricted, Rural, Other
Major Highways

TPS: General Rural, Recreation, Landscape

Lot/Location/Reserve numbers (Purpose),

Street name

1, 3739, 7867 Morrissey Rd; 2 Great Northern Hwy; 1 street not identified

Crown Reserve

Reserve C1654 (Conservation of Flora and Fauna)

Ownership Categories

Private, Local Government, State Government, Not identified

CALM Managed Land

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Dandaragan Plateau/Gingin Scarp

Laterite (Ql: G2)

Foothills

Colluvial Sand (Qc: S5)

Colluvial Sand (Qs: S6)

Pinjarra Plain

Guildford Formation (Qpa: Mgs1)

Wetlands (within the Pinjarra Plain)

Holocene Swamp Deposits (Qhw: Cps)

VEGETATION AND FLORA

Vegetation Complexes

Scarps

Reagan Complex

Pinjarra Plain

Beermullah Complex

Floristic Community Types

Supergroup 2: Seasonal Wetlands

- 5 Mixed shrub damplands
- 7 Herb-rich saline shrublands in clay pans
- 11 Wet forests and woodlands

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau

23a Central *Banksia attenuata* — *B. menziesii* woodlands (most northerly occurrence)

Supergroup 4: Uplands centred on Spearwood and Quindalup Dunes

28 Spearwood *Banksia attenuata* or *B. attenuata* — *Eucalyptus* woodlands (eastern representation of this community type)

WETLANDS

Wetland Types: palusplain

Natural Wetland Groups (undefined areas included in boundary)

Swan Coastal Plain Rivers

Ellen Brook (R.3)

Wetland Management Objectives: Conservation (56.3ha), Multiple Use

Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Not assessed, Vulnerable (floristic community type 7)

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated wetland, creek (seepage at base of eastern dunes), vegetated uplands

Vegetation and Flora: detailed survey (part Bushplan Site (Bullsbrook Nature Reserve) - Keighery, GJ, *et al.* 1997a); limited survey (part Bushplan Site - Alford 1996a, Chambers 1997a&b, Gibson *et al.* 1994 (Bull 01-12), Gray 1994a, Keighery, BJ, and Trudgen 1992)

Structural Units: mapping (Keighery, BJ, and Trudgen 1992, Keighery, GJ, *et al.* 1997a)

Uplands: *Eucalyptus marginata* Woodland to Forest; *Eucalyptus calophylla* Woodland; *Banksia attenuata* and *B. menziesii* Woodland with scattered *Eucalyptus todtiana*; *Banksia ilicifolia*, *B. attenuata* and *B. menziesii* Woodland; *Xanthorrhoea drummondii*, *Calothamnus sanguineus*, *Daviesia nudiflora* and *Hakea stenocarpa* Open Low Heath

Wetlands: *Eucalyptus rudis* Woodland; *Melaleuca preissii* Low Closed Forest; Shrublands dominated by *Melaleuca raphiophylla*, *M. viminea*, *M. uncinata* and *Actinostrobus pyramidalis* and combinations of these; *Melaleuca scabra* and *Verticordia densiflora* Open Low Heath; Mixed Open Heath; Mixed Herbland; Sedgeland dominated by *Leptocarpus canus*, *L. aristatus*, *Anarthria laevis*, *Restio stenostachyus* and *Lepidosperma longitudinale* and combinations of these; *Lepidosperma longitudinale* and *Baumea vaginalis* Sedgelands; *Cyclosorus interruptus* and *Pteris vittata* Fernland

Vegetation Condition: >90% Excellent to Very Good, <10% Good, with areas of severe localised disturbance

Total Flora: 440 native taxa, 63 weeds (Keighery, GJ, *et al.* 1997a) (estimated >90% of flora of entire Bushplan Site)

Significant Flora: Keighery, GJ, *et al.* 1997a - *Grevillea althoferorum* (R) (southern limit of range, only secure population); *Tripterococcus paniculatus* ms (1), *Eryngium pinnatifidum* subsp. *palustre* ms (2) (northern limit of range), *Schoenus* sp. Bullsbrook (JJ Alford 915) (2) (only known location), *Haemodorum loratum* (3) (disjunct population), *Lambertia multiflora* var. *darlingensis* (3), *Platysace ramosissima* (3), *Conostephium minus* (4), *Anthotium junciforme* (4), *Myriocephalus appendiculatus* (3) (southern limit of range), *Stylidium longitubum* (3); *Persoonia angustiflora* and *Grevillea obtusifolia* (southern limit of ranges), *Hakea cristata*, *Cyathochaeta avenacea* and *Pultenaea ericifolia* (northern limit of ranges), *Pteris vittata* and *Cyclosorus interruptus* (disjunct populations), *Podolepis gracilis* (Swamp form), *Eucalyptus marginata* subsp. *thalassica* (only known population on the Swan Coastal Plain), co-occurrence of *Hovea trisperma* var. *grandiflora* and *Hovea trisperma* var. *trisperma*, *Hakea cristata* (only record on the Swan Coastal Plain), swamp and sand forms of *Stirlingia latifolia*, *Eriostemon spicatus* and *Stylidium brunonianum*, *Tetratheca nuda* (very uncommon on the Plain, confined to a few localities on the foothills of the Darling Range and Dandaragan Plateau)

Fauna: no known information

Linkage: canopy linkage to bushland to the east (BS291); part of proposed Greenway 66 (Tingay, Alan & Associates 1997a); part of a regionally significant fragmented bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: part of the Bullsbrook Bushland area recommended for inclusion in a regional park (Keighery, BJ, and Trudgen 1992); 'outstanding conservation value' (Keighery, GJ, *et al.* 1997a); part Bushplan Site — Threatened or Poorly Reserved Plant Community (EPA 1994 GIS); contains plant communities representative of the eastern side of the Swan Coastal Plain

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed, Indicative Place of the Register of the National Estate (Gray 1994a, Chambers 1997a&b)

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 wetland; under MRS Parks and Recreation Restricted Zoning and TPS Landscape Zoning and Recreation Zoning, Crown Reserve

Constraints: private land; Titanium mineralisation subject to Mining lease 70/423 (Westralian Sands Ltd)

Recommendation: The existing purpose, care, control and management of Reserve C1654 is endorsed. The most appropriate mechanism for the protection of the remainder of this Bushplan Site be considered through the public comment period in consultation with the land owner(s). This may include parts for which — 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.

NEAVES ROAD CREEK, BULLSBROOK

Boundary Definition: management/bushland/conservation wetland boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 100 **Map no.** 29, 30 **Map sheet series ref. no.** 2034-I SE, 2134-IV SW

Other Names: not known

Area (ha): total 34.4; bushland 26.9

Local Authorities (Suburb)

Shire of Swan (Bullsbrook)

Zoning

MRS: Rural, Railways

TPS: Landscape, General Rural

Ownership Categories

Commonwealth Government, Private

Lot/Location/Reserve numbers (Purpose),

Street name

5, 1478 West Rd; 3, 100, 101, 2136, 2820 Neaves Rd; 8, 89, 1723 Bingham Rd; 2, 1520 Railway Pde; 0, 1 street not identified

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Pinjarra Plain

Guildford Formation (Qpa: Mgs1)

Bassendean Dunes

Bassendean Sands (Qpb: S8)

Bassendean Dunes/Pinjarra Plain

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

VEGETATION AND FLORA

Vegetation Complexes

Pinjarra Plain

Yanga Complex

Floristic Community Types: not sampled, types not inferred

Supergroup 2: Seasonal Wetlands

WETLANDS

Wetland Types: palusplain, creek

Natural Wetland Groups

Bassendean—Pinjarra transition OR Bassendean with fluvial features

Muchea (B/P.3)

Swan Coastal Plain Rivers

Ellen Brook (R.3)

Wetland Management Objectives: Conservation (7.2ha), Multiple Use

Swan Coastal Plain Lakes EPP: none identified
THREATENED ECOLOGICAL COMMUNITIES
 Not determined

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated wetland, creek

Vegetation and Flora: limited survey (Connell 1995, DEP 1998 (surveyed from roadside), Mattiske Consulting Pty Ltd 1997)

Structural Units

Wetlands: *Melaleuca raphiophylla* Low Open Forest with scattered *M. preissiana* and *Eucalyptus rudis*; *Lepidosperma ? gladiatum* Sedgeland; *Juncus pallidus* Sedgeland

Scattered Native Plants: not assessed

Vegetation Condition: Good to Degraded (Connell 1995, Mattiske Consulting Pty. Ltd. 1997)

Total Flora: not known

Significant Flora: none recorded

Fauna: no systematic survey. Significant mammal species: Quenda (Friend 1996 D)

Linkage: adjacent bushland to the west; part of proposed Greenway 43 (Tingay, Alan & Associates 1997a); part of a regionally significant fragmented bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: 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, Rarity, 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 conservation category wetlands; under TPS Landscape Zoning

Constraints: private land; under General Mineral Resource Area (sand)

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s).

PEARCE AERODROME AND ADJACENT BUSHLAND, BULLSBROOK

Boundary Definition: bushland (part taken to cadastre)/bushland group 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. 294 **Map no.** 30, 36 **Map sheet series ref. no.** 2134-IV SW

System 6 (1983): M15 area of bushland goes beyond System area boundaries, all bushland described

Other Names

Includes Pearce 2, Locations 101, 102, 106 - 108 (Keighery, BJ, and Trudgen 1992)

Local Authorities (Suburb)

Shire of Swan (Bullsbrook)

Ownership Categories

Commonwealth Government, Private (including commercial organisation)

Area (ha): total 817.1; bushland 213.5

Zoning

MRS: Urban, Public Purpose-Commonwealth Government, Rural, Other Major Highways

TPS: Landscape, General Rural, Recreation

Lot/Location/Reserve numbers (Purpose),

Street name

(creekline lots not identified)

1, 111, 112, 158 Railway Pde; 1, 2, 3, 124, 125, 126, 127 Great Northern Hwy; 1, 131, 132, 133, 134, 135, 136, 137, 142, 143, 144, 145, 146, 147, 158 Turner Rd; 2 Butternab Rd; 1, 2, 3, 4, 6, 91, 123, 124, 125, 158, 2736, 5304, 5462, 7162, 10788, 11518 street not identified

Crown Reserve

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Foothills

Colluvial Deposits (Qc: S5)

Colluvial Sand (Qs: S6)

Pinjarra Plain

Guildford Formation (Qpa: Mgs1, S11)

VEGETATION AND FLORA

Vegetation Complexes

Scarps

Reagan Complex (Dandaragan Plateau)

Pinjarra Plain

Guildford Complex (most northern occurrence)

Yanga Complex

Beermullah Complex

Floristic Community Types: *not sampled, types inferred

Supergroup 1: Foothills/Pinjarra Plain

*3c *Eucalyptus calophylla* — *Xanthorrhoea preissii* woodlands and shrublands

S8 *Eucalyptus wandoo* woodlands (Scarp)

Supergroup 2: Seasonal Wetlands

8 Herb-rich shrublands in clay pans

(some areas with overstorey of Wandoo, only such woodlands in very good condition on the Plain)

15 Forests and woodlands of deep seasonal wetlands

*S5 *Acacia saligna* wetlands

S7 Northern woodlands to forests over tall sedgeland alongside permanent wetlands

WETLANDS

Wetland Types: artificial channel, river (Ellen Brook), creek (Ki-it Monger Brook), palusplain

Natural Wetland Groups (undefined areas included in boundary)

Dandaragan Plateau

Red Gully (Dp.1)

Swan Coastal Plain Rivers

Ellen Brook (R.3)

Wetland Management Objectives: Conservation (41.6ha, 221m), Multiple Use

Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Not assessed, Not determined, Critically Endangered (floristic community type 3c, Muchea Limestones — Degraded Condition, but survey limited), Vulnerable (floristic community types 8 and 15)

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: Muchea Limestone, vegetated wetland, river, vegetated creekline and adjacent upland, vegetated uplands

Vegetation and Flora: limited survey (Alford 1996b, DEP 1996 (xPearce 01-05), Keighery, BJ, 1995a, Keighery, BJ, and Trudgen 1992)

Structural Units: mapping (part Bushplan Site — Keighery, BJ, and Trudgen 1992)

Uplands: *Banksia attenuata* and *B. menziesii* Woodland with scattered *Eucalyptus tottiana*; *Eucalyptus calophylla* Woodland; *Eucalyptus wandoo* Tall Woodland

Wetlands: *Casuarina obesa* Woodland; *Acacia saligna* Low Woodland; Scattered *Eucalyptus wandoo* over *Xanthorrhoea preissii*, *Acacia lasiocarpa* var. *bracteolata* and *Hypocalymma angustifolium* Open Low Heath; *Kunzea littorcola* ms and *densiflora* Shrubland; *Melaleuca raphiophylla* Low Woodland to Forest; *Viminaria juncea* Tall Shrubland; *Pericalymma* Open Heath, *Melaleuca* species Tall Open Scrub, *Hakea trifurcata*, *Allocasuarina humilis* and *Xanthorrhoea preissii* Open Heath; *Borya scirpoidea* Herbland; Mixed Herbland and *Leptocarpus coangustatus* Closed Sedgeland

Scattered Native Plants: *Eleocharis keigheryi* Sedgelands (in claypans in the mown areas); Ellen Brook and Ki-it Monger Brook rarely with native understorey - regionally significant vegetation recognised as being included in area of Bushplan Site in need of protection

Vegetation Condition: >50% Very Good to Excellent, <50% Good to Degraded, with areas of severe localised disturbance

Total Flora: 170 native taxa (estimated and plot-generated list, estimated >50% expected flora)

Significant Flora: *Centrolepis caespitosa* (R), *Eleocharis keigheryi* (R); *Acacia lasiocarpa* var. *bracteolata* (1), *Schoenus capillifolius* (2), *Synaphea acutiloba* (3) (Keighery, BJ, and Trudgen 1992); *Isopogon asper*, *Kunzea littorcola* ms, *Stylidium roseo-alatum*, *Astroloma macrocalyx*, *Myriocephalus helichrysoides*

Fauna: no systematic survey. One day in September 1996 assessment of birds (30) and amphibians (2) (J. Dell pers. comm.). Significant bird species: category 3 (3)

Linkage: adjacent bushland to the south (BS296) and east (BS89); part of proposed Greenway 50, 66, 43 (Tingay, Alan & Associates 1997a); part of a regionally significant fragmented bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: Muchea Limestone area; part of the Bullsbrook Bushland area recommended for inclusion in a regional park (Keighery, BJ, and Trudgen 1992); part Bushplan Site Threatened or Poorly Reserved Plant Community (EPA 1994 GIS); contains plant communities representative of the eastern side of the Swan Coastal Plain; contains 5234m of regionally significant river (WRC 1996a GIS)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed, Indicative Place of Register of the National Estate

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 TPS Recreation Zoning and Landscape Zoning, Crown Reserve

Constraints: private land; under MRS Urban Zoning, MRD regional road requirements

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s). This may include — 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.

MAROUBRA AVENUE BUSHLAND, BULLSBROOK

Boundary Definition: bushland taken to cadastre/bushland group 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. 89 **Map no.** 30 **Map sheet series ref. no.** 2134-IV SW

Other Names **Area (ha):** total 16.8; bushland 10.2

Pearce 3 and Pearce 5; Location 100 (Keighery, BJ, and Trudgen 1992)

Local Authorities (Suburb)
Shire of Swan (Bullsbrook)

Zoning
MRS: Urban, Other Major Highways
TPS: Landscape, Residential 1, Residential Development, General Commercial, Recreation
Lot/Location/Reserve numbers (Purpose),
Street name

Ownership Categories
Local Government, Commonwealth Government

1, 200, 201 Great Northern Hwy; 81 Chittering Rd; 80 Maroubra Ave; 90 Second Ave

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Foothills
Colluvial Deposits (Qc: Msg, S5)

Pinjarra Plain
Guildford Formation (Qpa: Mgs1)

VEGETATION AND FLORA

Vegetation Complexes

Pinjarra Plain
Guildford Complex

Floristic Community Types

Supergroup 1: Foothills/Pinjarra Plain

3c *Eucalyptus calophylla* — *Xanthorrhoea preissii* woodlands and shrublands (most northern representation sampled)

Supergroup 2: Seasonal Wetlands

6 Weed dominated wetlands on heavy soils

WETLANDS

Wetland Types: palusplain

Natural Wetland Groups (undefined areas included in boundary)

Darling Plateau

Walyunga (D.1)

Swan Coastal Plain Rivers

Ellen Brook (R.3)

Wetland Management Objectives: Conservation (5.5ha), Multiple Use

Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Not assessed, Critically Endangered (floristic community type 3c)

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated wetland, vegetated uplands

Vegetation and Flora: limited survey (Gibson *et al.* 1994 (Pearce 01-02), Keighery, BJ, and Trudgen 1992)

Structural Units: mapping (Keighery, BJ, and Trudgen 1992)

Uplands: *Eucalyptus wandoo* Open Woodland

Wetlands: *Eucalyptus wandoo* Open Woodland; *Hakea prostrata*, *Jacksonia sternbergiana*, *Daviesia horrida* and *Xanthorrhoea preissii* Shrubland; *Hypocalymma angustifolium* Open Low Heath; Sedgeland; Herbland

Vegetation Condition: >75% Very Good to Good, <25% Good to Degraded, with areas of severe localised disturbance

Total Flora: 84 native taxa, 19 weeds (plot-generated list, Gibson *et al.* 1994)

Significant Flora: *Acacia lasiocarpa* var. *bracteolata* (1)

Fauna: no known information

Linkage: no adjacent bushland; part of proposed Greenway 66 (Tingay, Alan & Associates 1997a); part of a regionally significant fragmented bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: part of the Bullsbrook Bushland area recommended for inclusion in a regional park (Keighery, BJ, and Trudgen 1992); Threatened or Poorly Reserved Plant Community (EPA 1994 GIS); 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 conservation category wetland; under TPS Recreation Zoning and Landscape Zoning

Constraints: private land; under MRS Urban Zoning, MRD regional road requirements

Recommendation: The Bushplan Site be reserved for Parks and Recreation in the Metropolitan Region Scheme and be purchased for Nature Reserve.

ASHTON ROAD BUSHLAND, BULLSBROOK

Boundary Definition: bushland (part taken to cadastre)/bushland group boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 88

Map no. 30

Map sheet series ref. no. 2134-IV SW

Other Names

Pearce 4; Submission Area 314 ; Location 103

(Keighery, BJ, and Trudgen 1992)

Local Authorities (Suburb)

Shire of Swan (Bullsbrook)

Zoning

MRS: Rural, Public Purpose-Commonwealth Government, Urban Deferred

TPS: Rural, General Rural, Public Purposes

Lot/Location/Reserve numbers (Purpose),

Street name

1, 26, 8652, 8655, 11322 Chittering Rd; 12883 street not identified

Crown Reserve

Ownership Categories

Commonwealth Government, Private, Not identified

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Dandaragan Plateau/Gingin Scarp

Osborne Formation (Ko: ST2)

Foothills

Colluvial Deposits (Qc: S5)

Colluvial Sand (Qs: S6)

VEGETATION AND FLORA

Vegetation Complexes

Scarps

Reagan Complex (Dandaragan Plateau, one of two most southern occurrences)

Pinjarra Plain

Guildford Complex (in area of northern most location)

Floristic Community Types: *not sampled, types inferred

Supergroup 1: Foothills/Pinjarra Plain

*S8 *Eucalyptus wandoo* woodlands (Scarp)

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau

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

Supergroup 4: Uplands centred on Spearwood and Quindalup Dunes

*28 Spearwood *Banksia attenuata* or *B. attenuata* — *Eucalyptus* woodlands (eastern representation of this community type)

WETLANDS

No wetlands mapped

THREATENED ECOLOGICAL COMMUNITIES

Not assessed, Not determined

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated uplands

Vegetation and Flora: limited survey (DEP 1996; Keighery, BJ, and Trudgen 1992)

Structural Units: mapping (Keighery, BJ, and Trudgen 1992)

Uplands: *Eucalyptus calophylla* and *E. marginata* Open Woodland; *Eucalyptus calophylla* and *E. wandoo* Woodland to Open Forest; *Eucalyptus marginata* Woodland; scattered *Eucalyptus calophylla* over *Banksia attenuata* and *B. menziesii* Low Woodland; mixed Open Low Heath

Scattered Native Plants: not assessed

Vegetation Condition: >60% Very Good to Excellent, <40 % Good to Degraded, with areas of severe localised disturbance

Total Flora: 56 native taxa (estimated >50% expected flora)

Significant Flora: *Astroloma macrocalyx*

Fauna: no known information

Linkage: no adjacent bushland

Other Special Attributes: part of the Bullsbrook Bushland area recommended for inclusion in a regional park (Keighery, BJ, and Trudgen 1992); Threatened or Poorly Reserved Plant Community (EPA 1994 GIS); 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

Opportunities and/or Constraints

Opportunities: Bushplan Site/part Bushplan Site subject to Swan and Canning Rivers EPP; under Crown Reserve

Constraints: private land; under MRS Urban Deferred Zoning, General Mineral Resource Area (clay)

Recommendation: The Bushplan Site be reserved for Parks and Recreation in the Metropolitan Region Scheme and be purchased for Nature Reserve.

DELLA ROAD SOUTH BUSHLAND, BULLSBROOK

Boundary Definition: bushland (part taken to cadastre)/conservation wetland boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 298

Map no. 35

Map sheet series ref. no. 2034-I SE

Other Names: not known
Local Authorities (Suburb)
 Shire of Swan (Bullsbrook)

Area (ha): total 10.3; bushland 10.1
Zoning
MRS: Rural
TPS: Landscape, General Rural
Lot/Location/Reserve numbers (Purpose),
Street name
 2294 Della South Rd; 1952 street not identified

Ownership Categories
 Private (including commercial organisation)

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Bassendean Dunes
 Bassendean Sands (Qpb: S8)
Bassendean Dunes/Pinjarra Plain
 Bassendean Sands over Guildford Formation (Qpb/Qpa:S10)
Wetlands (within the Bassendean Dunes/Pinjarra Plain)
 Holocene Swamp Deposits (Qhw: Cps)

VEGETATION AND FLORA

Vegetation Complexes
Pinjarra Plain
 Yanga Complex
Floristic Community Types: not sampled, types not inferred

WETLANDS

Wetland Types: floodplain, creek
Natural Wetland Groups
Bassendean—Pinjarra transition OR Bassendean with fluvial features
 Muchea (B/P.3)

Wetland Management Objectives: Conservation (9.3ha), Resource Enhancement
Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Not determined

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated wetland, creek, vegetated uplands
Vegetation and Flora: limited survey (Connell 1995, Mattiske Consulting Pty. Ltd. 1997)

Structural Units

Wetlands: *Melaleuca raphiophylla*, *Eucalyptus wandoo* Low Open Woodland; *Jacksonia sternbergiana*
Xanthorrhoea preissii Open Shrubland to Shrubland; *Dasyogon bromeliifolius* Low Open Shrubland
Vegetation Condition: Excellent to Good (Connell 1995, Mattiske Consulting Pty. Ltd. 1997)

Total Flora: not known

Significant Flora: none recorded

Fauna: no known information

Linkage: adjacent bushland to the south, east and west (BS399); part of a regionally significant contiguous bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: 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, 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 conservation category wetlands; under TPS Landscape Zoning
 Constraints: private land; under General Mineral Resource Area (sand)

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s).

SAWPIT ROAD BUSHLAND, BULLSBROOK

Boundary Definition: bushland (part taken to cadastre)/conservation wetland boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 13 **Map no.** 35 **Map sheet series ref. no.** 2034-I SE

Other Names: not known **Area (ha):** total 15.8; bushland 14.8

Local Authorities (Suburb) **Zoning**

Shire of Swan (Bullsbrook) **MRS:** Rural

Ownership Categories **TPS:** General Rural

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

Street name

5 Sawpit Rd

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Bassendean Dunes/Pinjarra Plain

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

Wetlands (within the Bassendean Dunes/Pinjarra Plain)

Holocene Swamp Deposits (Qhw: Cps)

VEGETATION AND FLORA

Vegetation Complexes

Pinjarra Plain

Yanga Complex

Floristic Community Types: not sampled, types not inferred

WETLANDS

Wetland Types: sumpland, palusplain, creek

Natural Wetland Groups

Bassendean—Pinjarra transition OR Bassendean with fluvial features

Muchea (B/P.3)

Wetland Management Objectives: Conservation (12.2ha), Multiple Use

Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Not determined

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated wetland, creek

Vegetation and Flora: limited survey (Connell 1995)

Structural Units: not surveyed

Vegetation Condition: Good (Connell 1995)

Total Flora: not known

Significant Flora: none recorded

Fauna: no known information

Linkage: adjacent bushland to the east; part of proposed Greenway 41 (Tingay, Alan & Associates 1997a)

Other Special Attributes: 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, 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 conservation category wetland

Constraints: private land; General Mineral Resource Area (sand)

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s).

TWIN SWAMPS NATURE RESERVE AND ADJACENT BUSHLAND, BULLSBROOK

Boundary Definition: protected area/bushland (part taken to cadastre) boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 400

Map no. 36

Map sheet series ref. no. 2134-IV SW

System 6 (1983): Part M17 area of bushland goes beyond System area boundaries, all bushland described

Other Names

Location 96 (Keighery, BJ, and Trudgen 1992)

Local Authorities (Suburb)

Shire of Swan (Bullsbrook)

Ownership Categories

Private, State Government, Not identified

CALM Managed Land

Area (ha): total 179.6 (includes open water); bushland 170.7

Zoning

MRS: Rural, Railways, Parks and Recreation

TPS: General Rural, Landscape

Lot/Location/Reserve numbers (Purpose),

Street name

23, 7897 Warbrook Rd; 34, 8307 Ellenbrook Rd

Crown Reserve

Reserve A27621 (Preservation of Fauna Short Necked Tortoise)

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Pinjarra Plain

Guildford Formation (Qpa: Mgs1)

Bassendean Dunes

Bassendean Sands (Qpb: S8)

Bassendean Dunes/Pinjarra Plain

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

Wetlands (within the Bassendean Dunes/Pinjarra Plain)

Holocene Swamp Deposits (Qhw: Cps)

VEGETATION AND FLORA

Vegetation Complexes

Pinjarra Plain

Yanga Complex (in area of southern limit)

Beermullah Complex

Floristic Community Types

Supergroup 2: Seasonal Wetlands

6 Weed dominated wetlands on heavy soils

11 Wet forests and woodlands

15 Forests and woodlands of deep seasonal wetlands

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau

21c Low lying *Banksia attenuata* woodlands or shrublands

WETLANDS

Wetland Types: sumpland, palusplain

Natural Wetland Groups

Bassendean—Pinjarra transition

Muchea (B/P.3)

Wetland Management Objectives: Conservation (95.9ha), Multiple Use

Swan Coastal Plain Lakes EPP: 3.6ha + 1.8ha = 5.4ha (total)

THREATENED ECOLOGICAL COMMUNITIES

Not assessed, Vulnerable (floristic community type 15)

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: open water, vegetated wetland, vegetated uplands

Vegetation and Flora: limited survey (part Bushplan Site (Twin Swamps Nature Reserve) — Gibson *et al.* 1994 (Twin 01-08, 10-11, 13), Keighery, BJ, and Trudgen 1992); detailed survey (Keighery, GJ, 1996)

Structural Units: mapping (part Bushplan Site (Twin Swamps Nature Reserve) — Keighery, BJ, and Trudgen 1992)

Uplands: Woodland to Open Forest dominated by *Banksia menziesii* and/or *B. attenuata*

Wetlands: *Melaleuca raphiophylla* Low Closed to Open Forest; *Acacia saligna* Low Open Woodland; *Melaleuca viminea* Tall Open Scrub; Closed to Open Heath dominated by *Melaleuca lateritia*, *M. teretifolia*, *Regelia ciliata* and *Astartea* aff. *fascicularis* and combinations of these with scattered emergent *Acacia saligna*, *Regelia ciliata* and *Pericalymma ellipticum* Open Low Heath; Herblands; Sedgelands

Vegetation Condition: >90% Very Good to Good, <10% Degraded, with areas of severe localised disturbance

Total Flora: 201 native taxa (Keighery, GJ, 1996) (estimated >70% expected flora)

Significant Flora: *Stylidium longitubum* (3); *Burchardia bairdiae*, *Kunzea littoricola* ms

Fauna: no systematic survey. Significant reptile species: Western Swamp Tortoise (*Pseudemydura umbrina*) (one of two remaining areas for this threatened species) (Burbidge and Kuchling 1994). Significant mammal species: Quenda (L. Mutter pers. comm. 1998)

Linkage: no adjacent bushland; part of proposed Greenway 41 (Tingay, Alan & Associates 1997a)

Other Special Attributes: see Fauna; contains plant communities representative of the eastern side of the Swan Coastal Plain

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

ANCA Directory of Important Wetlands in Australia; Listed on the Register of the National Estate

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, 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, Swan Coastal Plain Lakes EPP, Western Swamp Tortoise Draft EPP; location of Scheduled Fauna, conservation category wetlands; under MRS Parks and Recreation Reservation and TPS Landscape Zoning, Crown Reserve

Constraints: private land

Recommendation: The existing purpose, care, control and management of Reserve (27621) is endorsed. The most appropriate mechanism for the protection of the remainder of this Bushplan Site be considered through the public comment period in consultation with the land owner(s).

WALYUNGA ROAD BUSHLAND, BULLSBROOK

Boundary Definition: bushland (part taken to cadastre) boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 412 **Map no.** 36 **Map sheet series ref. no.** 2134-IV SW

Other Names: not known

Area (ha): total 47.9; bushland 44.5

Local Authorities (Suburb)

Zoning

Shire of Swan (Bullsbrook)

MRS: Rural, Parks and Recreation

TPS: Landscape

Ownership Categories

Lot/Location/Reserve numbers (Purpose),

Private

Street name

5, 7 Great Northern Hwy

Crown Reserve

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Darling Plateau (Darling Range)/Darling Scarp

Even-grained Granite (Ae, Aes: GR)

Conglomerate (PPG: CG)

Foothills

Leederville Formation (Klb: ST1) (generally associated with the Dandaragan Plateau/ Gingin Scarp)

Colluvial Deposits (Qc: Msg)

Ridge Hill Sandstone (Qph: SS)

VEGETATION AND FLORA

Vegetation Complexes

Foothills

Forrestfield Complex (Ridge Hill Shelf, Darling Plateau)

Floristic Community Types: not sampled, types not inferred

Supergroup 1: Foothills/Pinjarra Plain

Supergroup 2: Seasonal Wetlands

WETLANDS

Wetland Types: creek

Natural Wetland Groups

Darling Plateau

Walyunga (D.1)

Wetland Management Objectives: not assessed

Swan Coastal Plain Lakes EPP: none identified
THREATENED ECOLOGICAL COMMUNITIES
Not determined

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: creek, vegetated uplands
Vegetation and Flora: limited survey (DEP 1998, surveyed from roadside)
Structural Units

Uplands: *Eucalyptus marginata* Woodland; *Eucalyptus wandoo* Woodland with occasional *E. calophylla*; *Eucalyptus wandoo* Woodland; *Dryandra sessilis* Open Shrubland; *Acacia pulchella*, *Hakea lissocarpha* Open Shrubland

Wetlands: no known information

Vegetation Condition: 60% Very Good, 35% Good, with areas of severe localised disturbance

Total Flora: not known

Significant Flora: none recorded

Fauna: no known information

Linkage: adjacent bushland to the east protected in the Walyunga National Park; part of proposed Greenway 50 (Tingay, Alan & Associates 1997a); part of a regionally significant contiguous bushland/wetland linkage (Volume 2A, Map 8)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities

Opportunities and/or Constraints

Opportunities: Bushplan Site/part Bushplan Site subject to Swan and Canning Rivers EPP; under MRS Parks and Recreation Reservation and TPS Landscape Zoning, Crown Reserve

Constraints: private land; under General Mineral Resource Area (clay), mining tenement 21/2541/1 (PJ & WP Consolaro) for sand

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s).

ELLENBROOK NATURE RESERVE AND ADJACENT BUSHLAND, UPPER SWAN

Boundary Definition: protected area/bushland (part taken to cadastre) 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. 301 **Map no.** 36, 42 **Map sheet series ref. no.** 2134-III NW, 2134-IV SW
System 6 (1983): Part M17 area of bushland goes beyond System area boundaries, all bushland described

Other Names

J and B Martyn Reserve, part Location 95 (Keighery, BJ, and Trudgen 1992)

Area (ha): total 71.9; bushland 60.7

Local Authorities (Suburb)

Shire of Swan (Upper Swan)

Zoning

MRS: Parks and Recreation, Rural, Other Major Highways

TPS: Landscape, General Rural

Ownership Categories

Private (commercial organisation), Not identified

Lot/Location/Reserve numbers (Purpose),

Street name
12, 7715 Lexia Ave

Crown Reserve

CALM Managed Land

Reserve A27620 (Preservation of Fauna Short Necked Tortoise)

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Pinjarra Plain

Guildford Formation (Qpa: Mgs1, S11)

Wetlands (within the Pinjarra Plain)

Holocene Swamp Deposits (Qhw: Cps)



VEGETATION AND FLORA

Vegetation Complexes

Pinjarra Plain

Guildford Complex

Yanga Complex (in area of southern limit)

Floristic Community Types

Supergroup 1: Foothills/Pinjarra Plain

3c *Eucalyptus calophylla* — *Xanthorrhoea preissii* woodlands and shrublands

Supergroup 2: Seasonal Wetlands

6 Weed dominated wetlands on heavy soils

8 Herb-rich shrublands in clay pans

WETLANDS

Wetland Types: floodplain, palusplain, creek (Ellen Brook), river

Natural Wetland Groups

Swan Coastal Plain Rivers

Ellen Brook (R.3)

Wetland Management Objectives: Conservation (38.4ha), Resource Enhancement, Multiple Use

Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Not assessed, Critically Endangered (floristic community type 3c), Vulnerable (floristic community type 8)

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated wetland, creek, vegetated uplands

Vegetation and Flora: limited survey (part Bushplan Site (Ellenbrook Nature Reserve) — Gibson *et al.* 1994 (Ellen 01-07), Keighery, BJ, and Trudgen 1992); detailed survey (part Bushplan Site (Ellenbrook Nature Reserve) — Keighery, GJ, 1996)

Structural Units: mapping (Keighery, BJ, and Trudgen 1992)

Uplands: *Eucalyptus calophylla* Open Forest to Woodland

Wetlands: *Eucalyptus calophylla* Open Forest to Woodland; *Eucalyptus rudis* Open Forest; *Viminaria juncea* and *Acacia saligna* Tall Open Scrub; *Kunzea littoricola* ms and *Verticordia densiflora* Open Low Heath, sometimes with scattered emergent *Eucalyptus rudis*; *Melaleuca lateritia* Shrubland; Herbland dominated by *Borya scirpoidea*, *Tribonanthes australis*, Asteraceae and Stylidiaceae species and combinations of these; *Neurachne alopecuroidea* Open Grassland; Sedgeland dominated by *Leptocarpus canus*, *Chorizandra enodis*, *Cyathochaeta avenacea*; mixed Sedgeland

Scattered Native Plants: *Eucalyptus rudis* Woodland - regionally significant vegetation recognised as being included in the area of Bushplan Site in need of protection

Vegetation Condition: >50% Very Good to Excellent, <50% Good to Degraded, with areas of severe localised disturbance

Total Flora: 236 native taxa (Keighery, GJ, 1996) (estimated >60% expected flora)

Significant Flora: *Eleocharis keigheryi* (R), *Hydatella dioica* (R); *Stylidium longitubum* (1), *Eryngium pinnatifidum* subsp. *palustre* ms (2), *Schoenus capillifolius* (2), *Chamaescilla* sp. Ellen Brook (GJK 12501) (3), *Myriocephalus appendiculatus* (3), *Rhodanthe pyrethrum* (3), *Stylidium mimeticum* (3), *Hydrocotyle lemnoides* (4); *Pimelea imbricata* var. *major*

Fauna: no systematic survey. Significant reptile species: Western Swamp Tortoise (*Pseudemydura umbrina*) (one of two remaining areas for this threatened species) (Burbidge and Kuchling 1994). Significant mammal species: Quenda (L Mutter pers. comm. 1998)

Linkage: adjacent bushland to the north (BS296) and west (BS300); part of proposed Greenway 50 (Tingay, Alan & Associates 1997a); part of a regionally significant fragmented bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: contains plant communities representative of the eastern side of the Swan Coastal Plain; contains 1046m of regionally significant river (WRC 1996a GIS)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

ANCA Directory of Important Wetlands in Australia; Listed on the Register of the National Estate

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, Western Swamp Tortoise Draft EPP; location of Declared Rare Flora and Scheduled Fauna, conservation category wetlands; under MRS Parks and Recreation Reservation and TPS Landscape Zoning, Crown Reserve

Constraints: private land; under MRD regional road requirements, General Mineral Resource Area (clay)

Recommendation: The existing purpose, care, control and management of Reserve A27620 is endorsed. The most appropriate mechanism for the protection of the remainder of this Bushplan Site be considered through the public comment period in consultation with the land owner(s).

TOODYAY ROAD BUSHLAND, RED HILL

Boundary Definition: bushland (part taken to cadastre) boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 42 **Map no.** 48 **Map sheet series ref. no.** 2134-III NW

Other Names: not known

Area (ha): total 4.2; bushland 3.9

Local Authorities (Suburb)

Zoning

Shire of Swan (Red Hill)

MRS: Rural

TPS: Landscape, No Zone

Ownership Categories

Lot/Location/Reserve numbers (Purpose),

Private

Street name

53 Dalgety Rd

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Darling Plateau (Darling Range)/Darling Scarp

Even-grained Granite (Ae, Aes: M3)

Foothills

Colluvial Deposits (Qc: Smg)

VEGETATION AND FLORA

Vegetation Complexes

Foothills

Forrestfield Complex (Ridge Hill Shelf, Darling Plateau)

Floristic Community Types: *not sampled, type inferred

Supergroup 1: Foothills/Pinjarra Plain

*3c *Eucalyptus calophylla* — *Xanthorrhoea preissii* woodlands and shrublands

WETLANDS

Wetland Types: creek

Natural Wetland Groups

Darling Plateau

Walyunga (D.1)

Wetland Management Objectives: Resource Enhancement

Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Critically Endangered (floristic community type 3c)

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: creek, vegetated uplands

Vegetation and Flora limited survey (DEP 1998 (surveyed from roadside), Matiske Consulting Pty Ltd 1997)

Structural Units

Uplands: Scattered *Eucalyptus marginata* over Mixed Open heath

Wetlands: *Eucalyptus wandoo* and *E. rudis* Woodland

Vegetation Condition: Very Good to Excellent

Total Flora: not known

Significant Flora: *Lambertia multiflora* var. *darlingensis* (3)

Fauna: no known information

Linkage: no adjacent bushland

Other Special Attributes: contains plant communities representative of the eastern side of the Swan Coastal Plain; National Trust of Australia (WA) Classification

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Rarity

Opportunities and/or Constraints

Opportunities: Bushplan Site/part Bushplan Site subject to Swan and Canning Rivers EPP; under TPS

Landscape Zoning

Constraints: private land

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s).



TALBOT ROAD BUSHLAND, STRATTON/SWAN VIEW

Boundary Definition: protected area/bushland (part taken to cadastre) boundary (Areas of bushland within the boundaries of the Bushplan Site are not accurately mapped.)

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 306 **Map no.** 48, 53 **Map sheet series ref. no.** 2134-III NW, 2134-III SW

Other Names

Location 86 (Keighery, BJ, and Trudgen 1992)

Local Authorities (Suburb)

Shire of Swan (Stratton, Swan View)

Area (ha): total 101.3; bushland 96.3

Zoning

MRS: Parks and Recreation, Urban

TPS: Landscape, Residential Development, Residential 1, Public Purposes

Lot/Location/Reserve numbers (Purpose),

Street name

5524 Talbot Rd; 10556, 11314 O'Connor Rd; 11313 Myles Rd; 11764 Blanchard Rd
Crown Reserve

Ownership Categories

State Government

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Darling Plateau (Darling Range)/Darling Scarp

Even-grained Granite (Ae, Aes: M3)

Foothills

Colluvial Deposits (Qc: Mgs2)

Yoganup Formation (Qpr: S12)

VEGETATION AND FLORA

Vegetation Complexes

Foothills

Forrestfield Complex (Ridge Hill Shelf along base of Darling Plateau)

Pinjarra Plain

Guildford Complex

Floristic Community Types

Supergroup 1: Foothills/Pinjarra Plain

3c *Eucalyptus calophylla* — *Xanthorrhoea preissii* woodlands and shrublands

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau

20c Eastern shrublands and woodlands (only significant area)

WETLANDS

Wetland Types: creek, artificial channel

Natural Wetland Groups

Darling Plateau

Walyunga (D1)

Wetland Management Objectives: not assessed, Conservation (Keighery, GJ, and Keighery 1993a)

Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Critically Endangered (floristic community types 3c, 20c)

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated uplands (slope with view to Plain), vegetated creek

Vegetation and Flora: detailed survey (Keighery, GJ, and Keighery 1993a); limited survey (Gibson *et al.* 1994 (Talbot 01-13), Keighery, BJ, and Trudgen 1992)

Structural Units: mapping (Keighery, GJ, and Keighery 1993a)

Uplands: *Eucalyptus wandoo* Open Woodland; *Eucalyptus calophylla* and *E. wandoo* Woodland; *Eucalyptus calophylla* Open Woodland to Woodland; *Eucalyptus calophylla* and *E. marginata* Woodland; *Banksia attenuata* and *B. menziesii* Open Low Woodland to Low Woodland; *Adenanthos cygnorum* and *Allocasuarina humilis* Open Shrubland; *Hakea ruscifolia* Open Shrubland; *Hakea varia* and *H. ruscifolia* Heath; *Hakea trifurcata*, *H. undulata*, *Allocasuarina humilis* and *Beaufortia purpurea* Open Heath

Wetlands: *Eucalyptus calophylla* Open Woodland to Woodland; *Melaleuca raphiophylla* Low Woodland

Vegetation Condition: >90% Excellent to Very Good, <10 % Good to Degraded, with areas of severe localised disturbance associated with mining and tracks

Total Flora: 366 native taxa (Keighery, GJ, and Keighery 1993a) (estimated >90% expected flora)

Significant Flora: *Isopogon drummondii* (3), *Synaphea acutiloba* (3), *Synaphea pinnata* (3), *Hakea myrtooides* (3), *Lambertia multiflora* var. *darlingensis* (3), *Synaphea pinnata* (3), *Thysanotus glaucus* (4); *Trichocline*

spathulata, *Lomandra spartea*, *Haemodorum brevisepalum*, Keighery, GJ, and Keighery 1993a - *Aristida contorta*, *Stylidium affine*, *Grevillea endlicheriana*, *Grevillea glabrata* subsp. *glabrata*, *Conospermum incurvum* (most southern population in a reserve in the Perth Region)

Fauna: multiple and structured surveys by Western Australian Museum of Natural Science (How *et al.* 1996) for birds (47), native mammals (3), reptiles (13) and amphibians (7). Significant bird species: category 1 (1), category 3 (4) and category 4 (3). Significant mammal species: Honey Possum. High frog diversity

Linkage: no adjacent bushland; 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); National Trust of Australia (WA) Classification; contains plant communities representative of the eastern side of the Swan Coastal Plain; recommended that 'to encompass and protect the Talbot Road woodlands, Swan Locations 11764 and 11313 and Reserve #23 953 are amalgamated into a single A-class Nature Reserve with vesting in the NPNCA.' (Markey 1997)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Interim List of the Register of the National Estate

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 Scheduled Fauna; under MRS Parks and Recreation Reservation and TPS Landscape Zoning, Crown Reserve
Constraints: private land; under MRS Urban Zoning

Recommendation: Part Bushplan Site — 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. The most appropriate mechanism for the protection of the remainder of this Bushplan Site be considered through the public comment period in consultation with the land owner(s).

FARRALL ROAD BUSHLAND, STRATTON

Boundary Definition: bushland (part taken to cadastre) boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 309 **Map no. 53** **Map sheet series ref. no. 2134-III SW**

Other Names: not known

Local Authorities (Suburb)

Shire of Swan (Midvale)

Area (ha): total 1.6; bushland 1.6

Zoning

MRS: Urban

TPS: Residential Development

Lot/Location/Reserve numbers (Purpose),

Street name

14, 44 Farrall Rd

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Pinjarra Plain

Guildford Formation (Qpa: Mgs1)

VEGETATION AND FLORA

Vegetation Complexes

Pinjarra Plain

Guildford Complex

Floristic Community Types: not sampled, types not inferred

Supergroup 2: Seasonal Wetlands

WETLANDS

Wetland Types: palusplain, creek

Natural Wetland Groups

Swan Coastal Plain Rivers

Swan River (R.2)

Wetland Management Objectives: Multiple Use

Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Not determined

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated wetland

Vegetation and Flora: limited survey (DEP 1998)

Structural Units

Wetlands: *Melaleuca preissiana* Low Forest to Woodland

Vegetation Condition: Very Good to Degraded

Total Flora: not known

Significant Flora: none recorded

Fauna: no known information

Linkage: no adjacent bushland

Other Special Attributes: 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, 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

Constraints: private land; under MRS Urban Zoning

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s).

SOUTH GUILDFORD BUSHLAND

Boundary Definition: bushland (part taken to cadastre)/bushland group boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 311 **Map no.** 52 **Map sheet series ref. no.** 2034-II SE

Other Names: not known

Area (ha): total 21.8; bushland 21.4

Local Authorities (Suburb)

Zoning

Shire of Swan (South Guildford)

MRS: Public Purposes-Commonwealth Government

TPS: Landscape

Ownership Categories

Lot/Location/Reserve numbers (Purpose),

Commonwealth Government

Street name

7 Queens Rd

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Bassendean Dunes

Bassendean Sands (Qpb: S8)

Bassendean Dunes/Pinjarra Plain

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

Wetlands (within the Bassendean Dunes/Pinjarra Plain)

Holocene Swamp Deposits (Qhw: Cps)

VEGETATION AND FLORA

Vegetation Complexes

Pinjarra Plain

Guildford Complex

Combinations of Bassendean Dunes/Pinjarra Plain

Southern River Complex

Floristic Community Types: not sampled, types not inferred.

Supergroup 1: Foothills/Pinjarra Plain

Supergroup 2: Seasonal Wetlands

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau

WETLANDS

Wetland Types: sumpland, dampland, artificial channel

Natural Wetland Groups

Bassendean—Pinjarra transition OR Bassendean with fluvial features

Mungala (B/P.2)

Wetland Management Objectives: Conservation (2.2ha), Multiple Use

Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Not determined

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated wetland, vegetated uplands

Vegetation and Flora: limited survey (DEP 1998 (surveyed from roadside), Matiske Consulting Pty. Ltd. 1997)

Structural Units

Uplands: *Banksia menziesii*, *B. attenuata* and *Allocasuarina fraseriana* Woodland; *Banksia menziesii* and *B. grandis* Woodland; *Eucalyptus calophylla* Open Woodland over *Banksia menziesii*, *B. attenuata*, *Allocasuarina fraseriana* Low Open Woodland

Wetlands: *Eucalyptus rudis* Woodland over *Banksia ilicifolia*

Vegetation Condition: >20% Excellent, <40% Very Good to Good, <15% Degraded, with areas of severe localised disturbance (surveyed from roadside)

Total Flora: not known

Significant Flora: none recorded

Fauna: no systematic survey. Significant mammal species: Quenda (Friend 1996 D)

Linkage: no adjacent bushland; part of proposed Greenway 124 (Tingay, Alan & Associates 1997a); part of a regionally significant fragmented bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: 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, Rarity, 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 conservation category wetlands; under TPS Landscape Zoning

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s).

STIRLING CRESCENT BUSHLAND, HAZELMERE

Boundary Definition: bushland boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 481

Map no. 53

Map sheet series ref. no. 2134—III SW

Other Names: not known

Area (ha): total 36.7; bushland 31.5

Local Authorities (Suburb)

Zoning

Shire of Swan (Hazelmere)

MRS: Rural, Controlled Access Highways

TPS: General Rural

Ownership Categories

Private (including commercial organisation), State

Government, Not identified

Lot/Location/Reserve numbers (Purpose),

Street name

145, 148 Talbot Rd; 20, 111 Stirling Cr; 2, 3, 150 Lakes Rd; 1, 4, 5, 20 street not identified

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Bassendean Dunes

Bassendean Sands (Qpb: S8)

Bassendean Dunes/Pinjarra Plain

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

VEGETATION AND FLORA

Vegetation Complexes

Foothills

Forrestfield Complex (Ridge Hill Shelf, Darling Plateau)

Combinations of Bassendean Dunes/Pinjarra Plain

Southern River Complex

Floristic Community Types: * not sampled, types inferred

Supergroup 1: Foothills/Pinjarra Plain

*3a *Eucalyptus calophylla* - *Kingia australis* woodlands on heavy soils (most northerly with BS319 and BS45)

Supergroup 2: Seasonal Wetlands (not sampled, types not inferred)

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau

*20c Eastern shrublands and woodlands

WETLANDS

Wetland Types: palusplain

Natural Wetland Groups

Darling Plateau

Walyunga (D.1)

Bassendean—Pinjarra transition OR Bassendean with fluvial features

Mungala (B/P.2)

Wetland Management Objectives: Resource Enhancement

Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Not determined, Critically Endangered (floristic community types 3a and 20c)

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated wetland, vegetated uplands

Vegetation and Flora: limited survey (DEP 1998)

Structural Units

Uplands: *Banksia attenuata* and *B. menziesii* Low Woodland; scattered *Eucalyptus calophylla* over *Caustis dioica* Sedgeland

Wetlands: scattered *Eucalyptus calophylla* over Herbland and Sedgeland

Vegetation Condition: >70% Very Good, <30% Good to Degraded, with areas of severe localised disturbance

Total Flora: not known

Significant Flora: *Conospermum incurvum* (most southern population known in the Perth Region)

Fauna: no systematic survey. Significant mammal species: Quenda (Friend 1996 D)

Linkage: bushland linkage to north (across road) and to east (BS213); part of proposed Greenway 57 (Tingay, Alan & Associates 1997a)

Other Special Attributes: 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 met for inclusion: Representation of ecological communities, Rarity

Opportunities and/or Constraints

Opportunities: Bushplan Site/part Bushplan Site subject to Swan and Canning Rivers EPP

Constraints: private land; under MRD regional road requirements

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s).

BUSHMEAD BUSHLAND, SWAN

Boundary Definition: protected area/bushland (part taken to cadastre)/vegetation complex management boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 213 **Map no.** 53, 59 **Map sheet series ref. no.** 2134-III SW

System 6 (1983): part M34 area of bushland goes beyond System area boundaries, all bushland described

Other Names

Submission Area 284; Location 89 (Keighery, BJ, and Trudgen 1992)

Local Authorities (Suburb)

Shire of Mundaring (Helena Valley), Shire of Kalamunda (Gooseberry Hill)

Zoning

MRS: Public Purposes-Commonwealth Government, Urban, Rural, Parks and Recreation, Controlled Access Highways

TPS: Rural, Rural Landscape Living

Ownership Categories

Commonwealth Government, State Government, Local Government

Lot/Location/Reserve numbers (Purpose),

Street name

0, 9 Midland Rd; 20, 6726 Ridge Hill Rd; 7900 Zig Zag Scenic Dr
Crown Reserve

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Darling Plateau (Darling Range)/Darling Scarp

Laterite (Ql: G2, LA1)

Even-grained Granite (Ae, Aes: GR)

Foothills

Colluvial Deposits (Qc: Msg, Mgs2)

Yoganup Formation (Qpr: S12)

Ridge Hill Sandstone (Qph: SS)

Pinjarra Plain

Guildford Formation (Qpa: Mgs1)

Bassendean Dunes

Bassendean Sands (Qpb: S8)

Bassendean Dunes/Pinjarra Plain

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

VEGETATION AND FLORA

Vegetation Complexes

Foothills

Forrestfield Complex

Floristic Community Types: *not sampled, types inferred

Supergroup 1: Foothills/Pinjarra Plain

*3c *Eucalyptus calophylla* — *Xanthorrhoea preissii* woodlands and shrublands (areas within boundaries degraded, not suitable to be identified as threatened ecological community)

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau

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

20c Eastern shrublands and woodlands (most southern representation but atypical)

WETLANDS

Wetland Types: creek

Natural Wetland Groups

Darling Plateau

Walyunga (D.1)

Bassendean—Pinjarra transition

Mungala (B/P.2)

Swan Coastal Plain Rivers

Swan River (R.2)

Wetland Management Objectives: Conservation (4019.8m)

Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Critically Endangered (floristic community type 20c), Endangered (floristic community type 20a)

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: creek (Kadina Brook), vegetated uplands

Vegetation and Flora: detailed survey (Ecologia 1991); limited survey (DEP 1996 (Bushm 01–03), Markey 1997 (Bush 01, in adjacent bushland))

Structural Units: mapping (Ecologia 1991)

Uplands: *Eucalyptus wandoo* Woodland; *Banksia attenuata* and *Allocasuarina fraseriana* Open Woodland to Open Forest; *Eucalyptus calophylla* Woodland; *Lambertia multiflora* var. *darlingensis*, *Daviesia physodes* and *Isopogon drummondii* Shrubland

Wetlands: *Eucalyptus rudis* Woodland to Forest

Scattered Native Plants: Forest to Open Woodlands dominated by *Eucalyptus calophylla*, *E. rudis*, *E. marginata* and *Melaleuca raphiophylla* — regionally significant vegetation recognised as being included in the area of Bushplan Site in need of protection

Vegetation Condition: >70% Excellent to Very Good, <30% Good to Degraded, with areas of severe localised disturbance

Total Flora: 305 native taxa (Ecologia 1991) (estimated >75% expected flora)

Significant Flora: *Isopogon drummondii* (3), *Lambertia multiflora* var. *darlingensis* (3), *Persoonia sulcata* (3, Ecologia 1991); *Blancoa canescens*, *Eremaea fimbriata*, *Pityrodia bartlingii*, *Dasyopogon obliquifolius*



Fauna: structured survey by Western Australian Museum of Natural Science (Harvey *et al.* 1997) for birds (19), native mammals (1), reptiles (8) and amphibians (5). Significant bird species: category 3 (1) and category 4 (2). Significant mammal species: Quenda (Ecologia 1991)

Linkage: adjacent bushland to the north (BS216), south (BS217) and west (BS481); part of proposed Greenway 50 (Tingay, Alan & Associates 1997a); part of a regionally significant fragmented bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: one of a few areas in the PMR where the Plain and the Plateau meet through naturally vegetated areas (canopy and some bushland); contains plant communities representative of the eastern side of the Swan Coastal Plain; probably contains *Eucalyptus wandoo* Woodland from 'Eucalyptus wandoo woodland of community 1a' which is part of the only known example of this community type on the Ridge Hill Shelf and 'therefore requires secure protection'. (Markey 1997)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Listed on the Register of the National Estate

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, Criteria not relevant to determination of conservation value, but which may be applied when evaluating areas having similar values

Opportunities and/or Constraints

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

Constraints: under MRS Urban Zoning, MRD regional road requirements

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s).

ADELAIDE CRESCENT BUSHLAND, HELENA VALLEY

Boundary Definition: protected area/bushland (part taken to cadastre) boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 216 **Map no. 53** **Map sheet series ref. no. 2134-III SW**

Other Names

Location 88 (Keighery, BJ, and Trudgen 1992)

Local Authorities (Suburb)

Shire of Mundaring (Helena Valley)

Area (ha): total 14.9; bushland 14.7

Zoning

MRS: Rural, Parks and Recreation

TPS: Landscape, Rural Landscape Living, Public Open Space

Lot/Location/Reserve numbers (Purpose),

Street name

2, 500, 10660 Helena Valley Rd; 5 Adelaide Cr
Crown Reserve

Ownership Categories

Private, Local Government

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Darling Plateau (Darling Range)/Darling Scarp

Laterite (Ql: LA1)

Foothills

Colluvial Deposits (Qc: Msg)

Yoganup Formation (Qpr: S12)

Ridge Hill Sandstone (Qph: SS)

VEGETATION AND FLORA

Vegetation Complexes

Foothills

Forrestfield Complex (Ridge Hill Shelf, Darling Plateau)

Floristic Community Types: not sampled, types not inferred

Supergroup 1: Foothills/Pinjarra Plain

Supergroup 2: Seasonal Wetlands

WETLANDS

Wetland Types: creek

Natural Wetland Groups

Darling Plateau

Walyunga (D.1)

Wetland Management Objectives: Conservation (385.6m)

Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Not determined

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: creek, vegetated uplands

Vegetation and Flora: limited survey (DEP 1998 (surveyed from roadside), Keighery, BJ, and Trudgen 1992, Mattiske Consulting Pty Ltd 1997)

Structural Units:

Uplands: *Eucalyptus wandoo* Low Open Woodland to Open Woodland; *Eucalyptus calophylla* Open Woodland; *Hakea lissocarpa*, *Acacia pulchella* Open Heath

Wetlands: no known information

Vegetation Condition: 70% Excellent, <25% Very Good, with areas of severe localised disturbance

Total Flora: not known

Significant Flora: none recorded

Fauna: no systematic survey. Significant mammal species: Quenda (Friend 1996 D)

Linkage: adjacent bushland to the south (BS213) and east; part of a regionally significant fragmented bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: contains plant communities representative of the eastern side of the Swan Coastal Plain; contains Ridge Hill Sandstone, a thin (10m) sequence of shoreline sandstone and conglomerate, forming a geomorphic feature which is a reference level for global eustatic sea level correlations. Deposits are remnants of the oldest and highest shoreline feature in the Perth basin, thought to have been formed during the early Pleistocene (Lemmon *et al.* 1979)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Rarity, 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 conservation category wetlands; under MRS Parks and Recreation Reservation and TPS Landscape Zoning and Public Open Space Zoning, Crown Reserve

Constraints: private land

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s).

GOOSEBERRY HILL ROAD BUSHLAND, GOOSEBERRY HILL

Boundary Definition: protected area/vegetation complex boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 466

Map no. 59

Map sheet series ref. no. 2134-III SW

System 6 (1983): Part M34 Part System area bushland and part scattered native plants (canopy), only bushland described

Other Names

Area (ha): total 26.4; bushland 21.2

Location 90 (Keighery, BJ, and Trudgen 1992);

Gooseberry Hill Regional Open Space

Local Authorities (Suburb)

Shire of Kalamunda (Gooseberry Hill, Maida Vale)

Zoning

MRS: Urban, Rural, Parks and Recreation

TPS: Landscape

Lot/Location/Reserve numbers (Purpose),

Street name

2, 3, 7, 8, 9, 10, 11, 1181 Gooseberry Hill Rd; 17

Lascelles Pde; 50, 12446 Watsonia Rd; 34 June Rd

Crown Reserve

Ownership Categories

State Government

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Darling Plateau (Darling Range)/Darling Scarp

Even-grained Granite (Ae, Aes: GR)

Foothills

Colluvial Deposits (Qc: Mgs2)

VEGETATION AND FLORA

Vegetation Complexes

Foothills

Forrestfield Complex (Ridge Hill Shelf, Darling Plateau)

Floristic Community Types *not sampled, type inferred

Supergroup 1: Foothills/Pinjarra Plain

*3c *Eucalyptus calophylla* — *Xanthorrhoea preissii* woodlands and shrublands

WETLANDS

Wetland Types: creek

Natural Wetland Groups

Darling Plateau

Walyunga (D.1)

Wetland Management Objectives: Resource Enhancement

Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Critically Endangered (floristic community type 3c)

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated uplands, creek

Vegetation and Flora: limited survey (Keighery, BJ, and Trudgen 1992; Markey 1997 (GBHR 01-03))

Structural Units

Uplands: *Eucalyptus calophylla* and *E. marginata* Woodland; *Eucalyptus calophylla* and *E. wandoo* Woodland

Wetlands: scattered *Eucalyptus wandoo* over mixed Herbland; *Eucalyptus rudis* Woodland

Scattered Native Plants: not assessed

Vegetation Condition: >75% Excellent to Very Good, <25% Good, with areas of severe localised disturbance

Total Flora: not known

Significant Flora: *Conospermum undulatum* (R), *Templetonia drummondii* (4)

Linkage: adjacent bushland to east (continuation of the Darling Range Regional Park (DPUD 1993)); part of a regionally significant contiguous bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: contains plant communities representative of the eastern side of the Swan Coastal Plain; included in Darling Range Regional Park (MfP 1995); 'The Gooseberry Hill Regional Open Space contains significant remnants of the Ridge Hill Shelf floristic communities, including *Themeda australis* under *Eucalyptus rudis* woodland and a stand of *Conospermum undulatum*. Whilst this area will be incorporated into a National Park it requires careful management to remove the threat from weeds and disturbance.' (Markey 1997)

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 communities, 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; under MRS Parks and Recreation Reservation and TPS Landscape Zoning, Crown Reserve

Constraints: under MRS Urban Zoning

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.

HAWKEVALE BUSHLAND, HIGH WYCOMBE

Boundary Definition: bushland taken to cadastre boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 122

Map no. 53

Map sheet series ref. no. 2134-III SW

Other Names

Activ; Location 81 (Keighery, BJ, and Trudgen 1992);
Submission Area 148

Local Authorities (Suburb)

Shire of Kalamunda (High Wycombe)

Ownership Categories

Private (commercial organisation)

Area (ha): total 10.6; bushland 10.3

Zoning

MRS: Urban

TPS: Recreation/Open Space

Lot/Location/Reserve numbers (Purpose),

Street name

7561 Kalamunda Rd

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Bassendean Dunes

Bassendean Sands (Qpb: S8)

VEGETATION AND FLORA

Vegetation Complexes

Foothills

Forrestfield Complex (Ridge Hill Shelf, Darling Plateau)

Floristic Community Types

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau

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

WETLANDS

No wetlands mapped

THREATENED ECOLOGICAL COMMUNITIES

Endangered (floristic community type 20a)

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated uplands

Vegetation and Flora: limited survey (greater than Bushplan Site — DEP 1996 (Activ 01–03), Keighery, BJ, 1995c, Keighery, BJ, and Trudgen 1992)

Structural Units: mapping (Keighery, BJ, and Trudgen 1992)

Uplands: *Eucalyptus marginata* Open Forest to Woodland; Open Low Forest to Low Woodland dominated by *Eucalyptus marginata*, *Banksia attenuata* or *B. menziesii* and combinations of these; all over species-rich low heath

Vegetation Condition: >80% Excellent, <20 % Very Good, with areas of severe localised disturbance associated with tracks

Total Flora: 136 native taxa (Keighery, BJ, 1995c, Submission no. 83) (estimated >65% expected flora)

Significant Flora: *Conospermum undulatum* (R); *Isopogon drummondii* (3), *Lambertia multiflora* var. *darlingensis* (3); *Dasyogon obliquifolius*, *Hakea conchifolia*, *Pityrodia bartlingii*, *Xanthorrhoea drummondii*, *Blancoa canescens*, *Stylidium crossoccephalum* (southern limit, very variable species of scientific interest), *Eremaea fimbriata*

Fauna: no known information

Linkage: no adjacent bushland; part of proposed Greenway 57 (Tingay, Alan & Associates 1997a)

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); 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

Opportunities and/or Constraints

Opportunities: Bushplan Site/part Bushplan Site subject to Swan and Canning Rivers EPP; location of Declared Rare Flora; under TPS Recreation/Open Space Zoning, Planning Control Area No. 38

Constraints: private land; under MRS Urban Zoning

Recommendation: The Bushplan Site be reserved for Parks and Recreation in the Metropolitan Region Scheme and be purchased for Nature Reserve.



RIDGE HILL ROAD BUSHLAND, GOOSEBERRY HILL

Boundary Definition: bushland (part taken to cadastre) boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 217 Map no. 59 Map sheet series ref. no. 2134-III SW

Other Names: not known

Area (ha): total 11.6; bushland 11.6

Local Authorities (Suburb)
Shire of Kalamunda (Gooseberry Hill)

Zoning
MRS: Rural
TPS: Special Rural

Ownership Categories
Private, State Government

Lot/Location/Reserve numbers (Purpose),
Street name
32, 12034 John Farrant Dr; 28, 29, 30, 31, 1763 Ridge Hill Rd; 34, 43 Summerfield Pl; 19 Farrant St
Crown Reserve

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Pinjarra Plain
Guildford Formation (Qpa: Mgs2)

VEGETATION AND FLORA

Vegetation Complexes

Foothills
Forrestfield Complex (Ridge Hill Shelf, Darling Plateau)

Floristic Community Types: not sampled, types not inferred

Supergroup 1: Foothills/Pinjarra Plain

WETLANDS

Wetland Types: creek
Natural Wetland Groups
Darling Plateau
Walyunga (D.1)

Wetland Management Objectives: Conservation (108m)

Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Not determined

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: creek, vegetated uplands

Vegetation and Flora: limited survey (DEP 1998)

Structural Units

Uplands: *Eucalyptus calophylla* Open Woodland; *Calothamnus quadrifidus* Shrubland

Wetlands: no known information

Vegetation Condition: 50% Excellent, <40% Very Good, with areas of severe localised disturbance

Total Flora: not known

Significant Flora: none recorded

Fauna: no known information

Linkage: adjacent bushland to the north (BS213) and east (Darling Range Regional Park (DPUD 1993)); part of proposed Greenway 50 (Tingay, Alan & Associates 1997a); part of a regionally significant fragmented bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: 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, 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 conservation category wetlands; under Crown Reserve

Constraints: private land

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s).



MAIDA VALE RESERVE AND ADJACENT BUSHLAND, MAIDA VALE

Boundary Definition: protected area/bushland (part taken to cadastre) boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 316

Map no. 59

Map sheet series ref. no. 2134-III SW

Other Names

Submission Area 275, part Location 90 (Keighery, BJ, and Trudgen 1992)

Area (ha): total 35.9; bushland 15.0

Local Authorities (Suburb)

Shire of Kalamunda (Maida Vale)

Zoning

MRS: Urban, Rural

TPS: Landscape, Public Building, Recreation/Open Space, Special Rural

Ownership Categories

Private, State Government, Local Government

Lot/Location/Reserve numbers (Purpose),

Street name

201, 202, 203 Watsonia Rd; 8558, 11341, 11583

Kalamunda Rd; 8361 Casuarina Rd

Crown Reserve

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Foothills

Colluvial Deposits (Qc: Mgs2)

VEGETATION AND FLORA

Vegetation Complexes

Foothills

Forrestfield Complex (Ridge Hill Shelf, Darling Plateau)

Floristic Community Types

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau

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

WETLANDS

No wetlands mapped

THREATENED ECOLOGICAL COMMUNITIES

Endangered (floristic community type 20a)

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated uplands

Vegetation and Flora: limited survey (DEP 1996 (Maida 01-02))

Structural Units

Uplands: *Eucalyptus marginata* Open Woodland; *Mesomelaena pseudostygia* Sedgeland

Vegetation Condition: >75% Excellent to Very Good, <25% Good, with areas of severe localised disturbance

Total Flora: 90 native taxa, 4 weeds (plot-generated list only) (estimated <60% expected flora)

Significant Flora: *Conospermum undulatum* (R); *Haemodorum loratum* (3), *Lambertia multiflora* var. *darlingensis* (3), *Templetonia drummondii* (4); *Xanthorrhoea acanthostachya*, *Dasypogon obliquifolius*, *Pityrodia bartlingii*

Fauna: no known information

Linkage: no adjacent bushland; part of proposed Greenway 128 (Tingay, Alan & Associates 1997a)

Other Special Attributes: 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

Opportunities and/or Constraints

Opportunities: Bushplan Site/part Bushplan Site subject to Swan and Canning Rivers EPP; location of Declared Rare Flora; under TPS Landscape Zoning and Recreation/Open Space Zoning, Crown Reserve

Constraints: private land; under MRS Urban Zoning



Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s). This may include — 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.

POISON GULLY BUSHLAND, HIGH WYCOMBE

Boundary Definition: bushland (part taken to cadastre) boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 45 **Map no.** 58, 59 **Map sheet series ref. no.** 2134-III SW, 2034 II SE

Other Names

Locations 77 and 78 (Keighery, BJ, and Trudgen 1992)

Local Authorities (Suburb)

Shire of Kalamunda (High Wycombe)

Area (ha): total 13.1; bushland 11.6

Zoning

MRS: Urban, Rural, Controlled Access Highways
TPS: Landscape, Urban Development, High Wycombe Light Industry, Recreation/Open Space, Rural, Special Rural

Lot/Location/Reserve numbers (Purpose),

Street name

(creekline lots not identified)

0 Mack Pl; 12579 Milner Rd; 10051, 10273, 10368

Littlefield Rd; 12372 Brae Rd; 10999 Dundas Rd; 0 street not identified

Crown Reserve

Ownership Categories

State Government, Local Government, Not identified

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Bassendean Dunes/Pinjarra Plain

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

Foothills

Yoganup Formation (Qpr: S12)

VEGETATION AND FLORA

Vegetation Complexes

Foothills

Forrestfield Complex (Ridge Hill Shelf, Darling Plateau)

Combinations of Bassendean Dunes/Pinjarra Plain

Southern River Complex

Floristic Community Types: *not sampled, type inferred

Supergroup 1: Foothills/Pinjarra Plain

*3a *Eucalyptus calophylla* — *Kingia australis* woodlands on heavy soils (most northerly with BS319 and BS481)

WETLANDS

Wetland Types: palusplain, creek

Natural Wetland Groups

Darling Plateau

Walyunga (D.1)

Bassendean—Pinjarra transition OR Bassendean with fluvial features

Mungala (B/P.2)

Wetland Management Objectives: Conservation (2152.2m), Resource Enhancement

Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Critically Endangered (floristic community type 3a)

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated wetland, creek, vegetated upland

Vegetation and Flora: limited survey (Mattiske Consulting Pty. Ltd. 1997, part Bushplan Site - Keighery, BJ, and Trudgen 1992)

Structural Units:

Uplands: *Eucalyptus calophylla* and *E. wandoo* Woodland; *Eucalyptus calophylla*, *E. marginata* and *Allocasuarina fraseriana* Open Woodland



Wetlands: *Eucalyptus calophylla* Open Forest
Vegetation Condition: Very Good to Poor
Total Flora: not known
Significant Flora: *Conospermum undulatum* (R)

Fauna: no systematic survey. Significant mammal species: Quenda (Friend 1996 D)
Linkage: adjacent bushland to the south; part of proposed Greenway 59 (Tingay, Alan & Associates 1997a); part of a regionally significant fragmented bushland/wetland linkage (Volume 2A, Map 8)
Other Special Attributes: 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, Rarity, 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 TPS Landscape Zoning and Recreation/Open Space Zoning, Crown Reserve

Constraints: under MRS Urban Zoning, MRD regional road requirements

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s).

SULTANA ROAD WEST BUSHLAND, HIGH WYCOMBE

Boundary Definition: bushland (part taken to cadastre) boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 123 **Map no.** 58, 59 **Map sheet series ref. no.** 2034-II SE, 2134-III SW

Other Names

Location 75 (Keighery, BJ, and Trudgen 1992)

Local Authorities (Suburb)

Shire of Kalamunda (High Wycombe, Forrestfield)

Area (ha): total 15.2; bushland 15.1 (part area cleared after bushland mapping)

Zoning

MRS: Rural

TPS: Rural, Special Rural

Ownership Categories

Private (including commercial organisation)

Lot/Location/Reserve numbers (Purpose),

Street name

1, 2, 479, 498, 499 Sultana Rd

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Bassendean Dunes/Pinjarra Plain

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

VEGETATION AND FLORA

Vegetation Complexes

Foothills

Forrestfield Complex (Ridge Hill Shelf, Darling Plateau)

Combinations of Bassendean Dunes/Pinjarra Plain

Southern River Complex

Floristic Community Types

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau

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

WETLANDS

Wetland Types: palusplain, sumpland

Natural Wetland Groups

Bassendean—Pinjarra transition OR Bassendean with fluvial features

Mungala (B/P.2)

Wetland Management Objectives: Resource Enhancement

Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Endangered (floristic community type 20a)

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated uplands, vegetated wetlands

Vegetation and Flora: limited survey – part Bushplan Site (DEP 1996 (Sultana plot located outside BS), Keighery, BJ, and Trudgen 1992)

Structural Units: mapping (Keighery, BJ, and Trudgen 1992)

Upland: *Banksia attenuata* and *B. menziesii* Open Low Forest to Woodland over species-rich Mixed Closed Heath to Open Low Heath

Wetland: *Melaleuca preissiana* Low Open Woodland

Vegetation Condition: >80% Excellent to Pristine, <20% Very Good to Degraded, with areas of severe localised disturbance

Total Flora: 73 native taxa (plot-generated list only) (estimated 50% expected flora)

Significant Flora: *Conospermum undulatum* (R); *Haemodorum loratum* (3), *Isopogon drummondii* (3), *Lambertia multiflora* var. *darlingensis* (3); *Dasypogon obliquifolius*, *Eremaea fimbriata*, *Xanthorrhoea drummondii*, *Banksia incana*, *Hakea conchifolia*, *Pityrodia bartlingii*

Fauna: no systematic survey. Significant mammal species: Quenda (Friend 1996 D)

Linkage: adjacent canopy/bushland to the south and unmapped bushland to south-east to bushland along the Roe Highway; part of proposed Greenway 57 (Tingay, Alan & Associates 1997a)

Other Special Attributes: recommended to be managed for flora conservation, with a view to purchase by CALM (Keighery, BJ, and Trudgen 1992); Threatened or Poorly Reserved Plant Community (EPA 1994 GIS); 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, 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

Constraints: private land

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s). For Lot numbers 497, 498 and 499 this may include: The Bushplan Site be reserved for Parks and Recreation in the Metropolitan Region Scheme and be purchased for Nature Reserve.

DUNDAS ROAD BUSHLAND, FORRESTFIELD

Boundary Definition: bushland (part taken to cadastre) boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 319 **Map no.** 58 **Map sheet series ref. no.** 2034-II SE

System 6 (1983): Part M53 Part System area bushland, only bushland described

Other Names

Reserve C29880 Forrestfield; Submission Area 92;

Location 73 (Keighery, BJ, and Trudgen 1992)

Local Authorities (Suburb)

Shire of Kalamunda (Forrestfield)

Area (ha): total 65.6; bushland 58.1

Zoning

MRS: Industrial, Public Purposes-Special Uses, Public Purposes-State Energy Commission, Controlled Access Highways

TPS: Landscape, Light Industry

Lot/Location/Reserve numbers (Purpose),

Street name

0 Tonkin Hwy; 0 Reynolds Rd; 0, 9, 20, 30, 31, 32, 121, 181 Bedford Cr; Road; 0, 43, 44 Dawson Ave; 180, 10261, 10276, 11026 Dundas Rd; 10124, 10253 Roe Hwy; 10260 Harrison Rd; 9947 Berkshire Rd

Crown Reserve

Ownership Categories

State Government, Private (commercial organisation),

Local Government

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Pinjarra Plain

Guildford Formation (Qpa: Mgs1)

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 1: Foothills/Pinjarra Plain

2 Southern wet shrublands (most northern representation, only representation in PMR, disjunct from southern representations)

3a *Eucalyptus calophylla* — *Kingia australis* woodlands on heavy soils (most northerly representation with BS45 and BS481)

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau

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

WETLANDS

Wetland Types: palusplain, artificial channel, creek (not previously described, Keighery, BJ, 1994b)

Natural Wetland Groups

Bassendean—Pinjarra transition OR Bassendean with fluvial features

Mungala (B/P.2)

Wetland Management Objectives: Conservation (27.8ha) and Conservation (unknown length) (Keighery, BJ, 1994b), Resource Enhancement

Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Critically Endangered (floristic community type 3a), Endangered (floristic community types 2 and 20a)

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated creek, wetlands and uplands

Vegetation and Flora: limited survey (DEP 1996 (M53 02–06), Gibson *et al.* 1994 (M53), Keighery, BJ, 1994b, Keighery, BJ, and Trudgen 1992, Tingay 1990)

Structural Units: mapping (Keighery, BJ, 1994b, Keighery, BJ, and Trudgen 1992)

Uplands: *Eucalyptus marginata* Open Woodland; *Eucalyptus calophylla* Woodland; scattered *Eucalyptus calophylla* and *Nuytsia floribunda* over *Caustis dioica* Sedgeland; *Banksia attenuata* and *B. menziesii* Woodland; scattered *Hakea trifurcata* clumps over *H. incrassata*, *Acacia pulchella* and *Petrophile striata* Low Shrubland; *Stirlingia latifolia*, *Daviesia physodes*, *Allocasuarina humilis* and *Verticordia densiflora* Open Low Heath

Wetlands: *Eucalyptus calophylla* Woodland; *Pericalymma ellipticum*, *Hakea sulcata* and *Stirlingia latifolia* Open Low Heath

Vegetation Condition: >90% Excellent to Very Good, <10% Good, with areas of severe localised disturbance

Total Flora: 223 native taxa (Keighery, BJ, 1994b) (estimated >75% expected flora)

Significant Flora: *Conospermum undulatum* (R), *Macarthuria keigheryi* (R); *Schoenus pennisetis* (1), *Isopogon drummondii* (3), *Schoenus benthamii* (3), *Lambertia multiflora* var. *darlingensis* (3), *Conostephium minus* (4); *Verticordia lindleyi* subsp. *lindleyi* (4); *Actinostrobos acuminatus*, *Dasyogon obliquifolius*, *Platysace juncea*, *Xanthorrhoea drummondii*, *Hakea conchifolia*, *Pityrodia bartlingii*, *Byblis gigantea*, *Drosera macrantha* (Swan Coastal Plain form, BJK and NG 228), *Isopogon asper*

Fauna: no systematic survey. Significant mammal species: Quenda (Friend 1996 D)

Linkage: no adjacent bushland; part of proposed Greenways 57, 117, 84 (Tingay, Alan & Associates 1997a); part of a regionally significant fragmented bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: unusual combination of a series of rare, uncommon and restricted floristic community types; recommended to be managed as a flora conservation area (Keighery, BJ, and Trudgen 1992); recommended to be declared as an A-class Nature Reserve for the protection of flora and fauna in Gibson *et al.* 1994; part 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 TPS Landscape Zoning, Crown Reserve

Constraints: private land; under MRS Industrial Zoning, MRD regional road requirements

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s). This may include parts for which: The Bushplan Site be reserved for Parks and Recreation in the Metropolitan Region Scheme and be purchased for National Park, Conservation Park, Nature Reserve or Regional Park.

PIONEER PARK BUSHLAND, FORRESTFIELD

Boundary Definition: bushland (part taken to zoning) boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 440 **Map no.** 58 **Map sheet series ref. no.** 2034-II SE

System 6 (1983): Part M53 Part System area bushland, only bushland described

Other Names: not known

Area (ha): total 52.8; bushland 11.5

Local Authorities (Suburb)

Zoning

Shire of Kalamunda (Forrestfield)

MRS: Urban, Rural, Controlled Access Highways

TPS: Landscape, Recreation/Open Space

Ownership Categories

Lot/Location/Reserve numbers (Purpose),

Local Government, State Government

Street name

1, 11239, 12588 Dawson Ave; 10125 Roe Hwy

Crown Reserve

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Pinjarra Plain

Guildford Formation (Qpa: Mgs1)

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: *not sampled, types inferred

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau

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

WETLANDS

No wetlands mapped

THREATENED ECOLOGICAL COMMUNITIES

Endangered (floristic community type 20a)

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated uplands

Vegetation and Flora: limited survey (DEP 1998)

Structural Units

Uplands: *Eucalyptus marginata* Open Woodland; mixed *Eucalyptus marginata*, *Allocasuarina fraseriana* Woodland; *Allocasuarina fraseriana* Woodland; mixed Open Heath; *Adenanthos barbigerus* Open Heath

Vegetation Condition: <50% Excellent to Very Good, >50% Good to Degraded, with areas of severe localised disturbance

Total Flora: not known

Significant Flora: *Conospermum undulatum* (R); *Isopogon drummondii* (3), *Olax scalariformis* (3)

Fauna: no systematic survey. Significant mammal species: Quenda (Friend 1996 D)

Linkage: no adjacent bushland; part of a regionally significant fragmented bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: 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

Opportunities and/or Constraints

Opportunities: Bushplan Site/part Bushplan Site subject to Swan and Canning Rivers EPP; location of Declared Rare Flora; under TPS Landscape Zoning and Recreation/Open Space Zoning, Crown Reserve

Constraints: under MRS Urban Zoning, 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.

TOMAH ROAD BUSHLAND, WATTLE GROVE

Boundary Definition: protected area boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 282

Map no. 58

Map sheet series ref. no. 2034-II SE

Other Names

Submission Area 274

Local Authorities (Suburb)

Shire of Kalamunda (Wattle Grove)

Area (ha): total 7.2; bushland 5.6

Zoning

MRS: Parks and Recreation, Controlled Access

Highways

TPS: Landscape

Lot/Location/Reserve numbers (Purpose),

Street name

50 Tomah Rd; 51, 52 Saint John Rd

Ownership Categories

State Government

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Pinjarra Plain

Guildford Formation (Qpa: Mgs1)

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: not sampled, types not inferred

Supergroup 2: Seasonal Wetlands

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau

WETLANDS

Wetland Types: sumpland, palusplain, creek, artificial channel

Natural Wetland Groups

Bassendean—Pinjarra transition OR Bassendean with fluvial features

Mungala (B/P.2)

Wetland Management Objectives: Conservation (1.2ha, 113.7m), Resource Enhancement

Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Not determined

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated wetland, creek, vegetated uplands

Vegetation and Flora: detailed survey (Le Provost *et al.* 1987)

Structural Units: mapping (Le Provost *et al.* 1987)

Uplands: *Eucalyptus calophylla* Woodland



Wetlands: *Melaleuca raphiophylla* Low Forest with emergent *Eucalyptus rudis*; *Banksia attenuata*, *B. menziesii*, *B. ilicifolia* and *Kunzea ericifolia* Low Woodland; *Melaleuca raphiophylla* Tall Closed Scrub; *Melaleuca viminea* Tall Closed Scrub; *Lepidosperma longitudinale* Sedgeland

Vegetation Condition: Very Good to Degraded, with areas of severe localised disturbance (inferred from Le Provost *et al.* 1987 and Submission no. 170d)

Total Flora: not known

Significant Flora: none recorded

Fauna: no systematic survey. Significant mammal species: Quenda (Friend 1996 D)

Linkage: no adjacent bushland; part of proposed Greenway 123 (Tingay, Alan & Associates 1997a)

Other Special Attributes: 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, Rarity, 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 conservation category wetlands; under MRS Parks and Recreation Reservation and TPS Landscape Zoning

Constraints: under MRD regional road requirements

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s).

McDOWELL STREET BUSHLAND, WELSHPOOL

Boundary Definition: bushland taken to zoning boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 424 **Map no.** 58, 63 **Map sheet series ref. no.** 2033-I NE, 2034-II SE

Other Names

Location 69 (Keighery, BJ, and Trudgen 1992)

Local Authorities (Suburb)

City of Canning (Welshpool)

Ownership Categories

State Government

Area (ha): total 13.5; bushland 8.1

Zoning

MRS: Urban, Industrial, Controlled Access Highways

TPS: Local Park and Recreation Area, Landscape

Lot/Location/Reserve numbers (Purpose),

Street name

3332, 3333 Welshpool Rd; 3330 Banksia Rd; 3331

McDowell St

Crown Reserve

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

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/Spearwood Dunes

Southern River Complex

Floristic Community Types: *not sampled, types inferred

Supergroup 2: Seasonal Wetlands

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau

*20a *Banksia attenuata* woodlands over species-rich dense shrublands AND/OR

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

WETLANDS

Wetland Types: artificial lake, dampland (not previously described, Keighery, BJ, and Trudgen 1992)

Natural Wetland Groups

Bassendean—Pinjarra transition OR Bassendean with fluvial features

Mungala (B/P.2)

Wetland Management Objectives: Conservation (0.3ha)

Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

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

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated wetland, vegetated uplands

Vegetation and Flora limited survey (Keighery, BJ, and Trudgen 1992)

Structural Units: mapping (Keighery, BJ, and Trudgen 1992)

Uplands: *Eucalyptus calophylla* Woodland to Open Forest; *Banksia attenuata* and *B. menziesii* Low Woodland

Wetlands: *Melaleuca preissiana* and *Acacia saligna* Low Open woodland

Vegetation Condition: Very Good to Degraded, with areas of severe localised disturbance

Total Flora: not known

Significant Flora: *Conospermum triplinervium*

Fauna: no known information

Linkage: adjacent bushland to the south (BS283)

Other Special Attributes: 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, 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

Opportunities and/or Constraints

Opportunities: Bushplan Site/part Bushplan Site subject to Swan and Canning Rivers EPP; location of conservation category wetlands; under TPS Local Park and Recreation Area Zoning and Landscape Zoning, Crown Reserve

Constraints: under MRS Urban Zoning, MRS Industrial Zoning, MRD regional roads 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.

QUEENS PARK BUSHLAND, QUEENS PARK

Boundary Definition: protected area/Western Australian Planning Commission owned land boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 283 **Map no.** 58, 63 **Map sheet series ref. no.** 2033-I NE, 2034-II SE

Other Names

Part Submission Area 140, 31; Location 69 (Keighery, BJ, and Trudgen 1992)

Local Authorities (Suburb)

City of Canning (Queens Park, East Cannington)

Area (ha): total 40.7 (includes open water); bushland 14.4

Zoning

MRS: Urban, Parks and Recreation

TPS: Landscape, Local Park and Recreation Area, Residential

Lot/Location/Reserve numbers (Purpose),

Street name

1894 Gibbs St; 0, 101, 581 Welshpool Rd; 22 Wharf St
Crown Reserve

Ownership Categories

State Government, Local Government, Private (commercial organisation)

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

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: *not sampled, types inferred

Supergroup 1: Foothills/Pinjarra Plain

*3a *Eucalyptus calophylla* — *Kingia australis* woodlands on heavy soils

Supergroup 2: Seasonal Wetlands

*4 *Melaleuca preissiana* damplands

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau

*23a Central *Banksia attenuata* — *B. menziesii* woodlands AND/OR

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

WETLANDS

Wetland Types: dampland, artificial channel

Natural Wetland Groups

Bassendean—Pinjarra transition OR Bassendean with fluvial features
Mungala (B/P.2)

Wetland Management Objectives: Resource Enhancement

Swan Coastal Plain Lakes EPP: 1ha

THREATENED ECOLOGICAL COMMUNITIES

Not assessed, Critically Endangered (floristic community type 3a), possibly Endangered (floristic community type 20a)

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: open water, vegetated wetland, vegetated uplands

Vegetation and Flora: limited survey (DEP 1996, Hames Sharley Australia 1993), detailed survey (Tauss 1997)

Structural Units: mapping Hames Sharley Australia 1993

Uplands: *Eucalyptus calophylla* Woodland to Forest; *Banksia attenuata* and *B. menziesii* Low Woodland to Low Forest, *Jacksonia furcellata* Shrubland

Wetlands: *Eucalyptus calophylla* Woodland and *Melaleuca preissiana* Low Open Woodland

Scattered Native Plants: within protected area *Eucalyptus rudis* Woodland; *Melaleuca raphiophylla* Low Forest; some scattered and clumped trees in Completely Degraded area, habitat provided by drain into artificial lake

Vegetation Condition: >25% Very Good to Excellent, >70% Good to Degraded, with areas of severe localised disturbance

Total Flora: 167 native taxa (Tauss 1997) (estimated >85% expected flora)

Significant Flora: *Macarthuria keigheryi* (R) (Tauss 1997)

Fauna: no known information

Linkage: adjacent bushland to the north across Welshpool Road (BS424); part of proposed Greenways 88, 89 (Tingay, Alan & Associates 1997a)

Other Special Attributes: 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, Rarity, 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

Opportunities and/or Constraints

Opportunities: Bushplan Site/part Bushplan Site subject to Swan and Canning Rivers EPP, Swan Coastal Plain Lakes EPP; location of Declared Rare Flora; under MRS Parks and Recreation Reservation, TPS Landscape Zoning and Local Park and Recreation Area Zoning, Crown Reserve

Constraints: private land; under MRS Urban Zoning

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.

NICHOLSON ROAD BUSHLAND, LANGFORD/THORNIE

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. 456 **Map no.** 62, 63 **Map sheet series ref. no.** 2033-I NE

Other Names

Area of the Tom Bateman Sporting Complex, Gosnells remnant bushland areas 33 and 34 (Trudgen and Keighery 1995)

Local Authorities (Suburb)
City of Gosnells (Thornlie, Langford)

Area (ha): total 70.2; bushland 13.3

Zoning

MRS: Parks and Recreation, Controlled Access
Highways
TPS: Landscape

Ownership Categories

State Government

Lot/Location/Reserve numbers (Purpose),

Street name

0, 1, 2, 3, 19, 34, 36 Nicholson Rd; 1, 5, 14, 55, 102
Cameron St; 1, 3, 5, 6, 20, 21, 31, 32, 33, 34, 35
Wilfred Rd; 2, 10 Woodmore Rd

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Pinjarra Plain

Guildford Formation (Qpa: Cs, Sc)

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: *not sampled, types not inferred

Supergroup 2: Seasonal Wetlands

- 4 *Melaleuca preissiana* damplands
- 8 Herb-rich shrublands in clay pans
- 10a Shrublands on dry clay flats

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau

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

WETLANDS

Wetland Types: dampland, artificial channel

Natural Wetland Groups

Bassendean—Pinjarra transition OR Bassendean with fluvial features

Bennett Brook (B/P.4)

Wetland Management Objectives: Conservation (6.3ha), Resource Enhancement

Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Not assessed, Endangered (floristic community type 10a), Vulnerable (floristic community type 8)

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated wetland, vegetated uplands

Vegetation and Flora: limited survey (Trudgen and Keighery 1995 (Gosn 6–11))

Structural Units: mapping (Trudgen and Keighery 1995)

Uplands: Low Open Woodlands to Low Closed Forests dominated by combinations of *Banksia attenuata*, *B. menziesii*, *B. illicifolia* and *Allocasuarina fraseriana*; *Eucalyptus calophylla*, *E. marginata* and *Allocasuarina fraseriana* Woodland to Open Forest; *Banksia attenuata*, *B. menziesii*, *B. illicifolia*, *Eucalyptus marginata* and *Allocasuarina fraseriana* Low Woodland to Low Open Forest; *Banksia attenuata*, *B. menziesii* and *E. todtiana* Low Woodland to Low Open Forest

Wetlands: Low Open Woodlands to Low Woodlands dominated by combinations of *Melaleuca preissiana*, *Eucalyptus todtiana*, *Allocasuarina fraseriana*, *Banksia attenuata* and *Nuytsia floribunda*; *Melaleuca preissiana* Low Open Woodland to Low Open Forest; *Melaleuca raphiophylla* Low Open Woodland to Low Open Forest; *Melaleuca incana*, *M. viminea* and *M. raphiophylla* Low Open Forest; *Melaleuca raphiophylla* and *M. viminea*

Low Open Woodland to Open Woodland; *Regelia ciliata* Closed Heath to Closed Tall Scrub; *Pericalymma ellipticum* Closed Heath; *Astartea* sp. Brixton Street and *Regelia ciliata* Shrubland to Open Heath; *Hypocalymma angustifolium* and *Melaleuca* sp. B Low Open Heath; *Evandra pauciflora* Closed Sedgeland

Vegetation Condition: >60% Very Good to Excellent, <40% Good, with areas of severe localised disturbance

Total Flora: not known

Significant Flora: Trudgen and Keighery 1995 - *Eryngium pinnatifidum* subsp. *palustre* ms (2), *Verticordia lindleyi* subsp. *lindleyi* (4); *Jacksonia gracilis*; at least 10 taxa characteristic of the eastern side of the SCP

Fauna: no systematic survey. Significant mammal species: Quenda (Friend 1996 D)

Linkage: no adjacent bushland

Other Special Attributes: 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, Rarity, 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

Opportunities and/or Constraints

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

Constraints: 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.

BOUGAINVILLE AVENUE 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. 401 **Map no.** 58, 59 **Map sheet series ref. no.** 2034-II SE, 2134-III SW

Other Names

Agriculture Protection Board

Local Authorities (Suburb)

Shire of Kalamunda (Forrestfield)

Ownership Categories

State Government

CALM Managed Land

Area (ha): total 13.3; bushland 5.4

Zoning

MRS: Urban

TPS: Public Building, Recreation/Open Space

Lot/Location/Reserve numbers (Purpose),

Street name

11858 Bougainvillea Ave

Crown Reserve

Reserve 29815 (Use and requirements of Agricultural Protection Board and conservation)

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Bassendean Dunes

Bassendean Sands (Qpb: S8)

VEGETATION AND FLORA

Vegetation Complexes

Combinations of Bassendean Dunes/Pinjarra Plain

Southern River Complex



Floristic Community Types

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau

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

WETLANDS

No wetlands mapped

THREATENED ECOLOGICAL COMMUNITIES

Endangered (floristic community type 20a)

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated uplands

Vegetation and Flora: detailed survey (Robinson and Mawson 1992); limited survey (Gibson *et al.* 1994 (APBF 01-02))

Structural Units

Uplands: *Eucalyptus marginata* Open Woodland; *Banksia menziesii* and *B. attenuata* Open Forest to Woodland over Mixed Open Heath; Mixed Open Heath

Vegetation Condition: >90% Excellent, <10% Pristine, with areas of severe localised disturbance

Total Flora: 182 native taxa (Robinson and Mawson 1992) (estimated >90% expected flora)

Significant Flora: *Conospermum undulatum* (R); *Haemodorum loratum* (3), *Lambertia multiflora* var. *darlingensis* (3), *Isopogon drummondii* (3), *Dryandra pteridifolia* subsp. *vernalis* (3) (Robinson and Mawson 1992), *Olax scalariformis* (3) (Robinson and Mawson 1992); *Dasyopogon obliquifolius*, *Schoenus latitans*, *Xanthorrhoea drummondii*, *Eremaea fimbriata*, *Hakea conchifolia*, *Pityrodia bartlingii*, *Stenanthemum humile*, *Banksia incana*

Fauna: multiple surveys for birds (55) (Mawson & Massam 1995). Good assemblage of resident and seasonal visitors. Significant bird species: category 1 (2), category 3 (4) and category 4 (7). Significant mammal species: Quenda (Friend 1996 D)

Linkage: no adjacent bushland

Other Special Attributes: Threatened or Poorly Reserved Plant Community (EPA 1994 GIS); 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

Opportunities and/or Constraints

Opportunities: Bushplan Site/ part Bushplan Site subject to Swan and Canning Rivers EPP; location of Declared Rare Flora and Scheduled Fauna; under TPS Recreation/Open Space Zoning; Crown Reserve

Constraints: under MRS Urban Zoning

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 applying appropriate mechanisms in consultation with the reserve management body.

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)

Area (ha): total 176.9; bushland 73.6

Zoning

MRS: Parks and Recreation, Controlled Access

Highways

TPS: Landscape

Ownership Categories

Private (including commercial organisation), State
Government

**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

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 *Actinostrobilus pyramidalis* and *Beaufortia squarrosa*; scattered clumps of *Melaleuca viminea* over *Leptocarpus 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 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.

WELSHPOOL ROAD BUSHLAND, WATTLE GROVE

Boundary Definition: bushland (part taken to cadastre) boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 50 **Map no. 64** **Map sheet series ref. no. 2133-IV NW**

Other Names

Location 67 (Keighery, BJ, and Trudgen 1992)

Local Authorities (Suburb)

Shire of Kalamunda (Wattle Grove)

Area (ha): total 5.1; bushland 4.7

Zoning

MRS: Rural

TPS: Rural, Landscape

Ownership Categories

Private, State Government

Lot/Location/Reserve numbers (Purpose),

Street name

1 Welshpool Rd; 15, 2611, 2615 Schofield Rd; 707

Gavour Rd

Crown Reserve

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Foothills

Colluvial Deposits (Qc: Mgs2)

Bassendean Dunes/Pinjarra Plain

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

VEGETATION AND FLORA

Vegetation Complexes

Foothills

Forrestfield Complex (Ridge Hill Shelf, Darling Plateau)

Floristic Community Types: *not sampled, types inferred

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)

WETLANDS

No wetlands mapped



THREATENED ECOLOGICAL COMMUNITIES

Endangered (floristic community type 20a)

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated uplands

Vegetation and Flora: limited survey (DEP 1998, Keighery, BJ, and Trudgen 1992, Mattiske Consulting Pty Ltd 1997)

Structural Units: *Banksia attenuata*, *B. menziesii*, *Eucalyptus marginata* subsp. *elegantella* and *Nuytsia floribunda* Woodland; *Eucalyptus calophylla* Open Woodland

Vegetation Condition: >65% Excellent to Very Good, <35% Good to Degraded, with areas of severe localised disturbance

Total Flora: not known

Significant Flora: *Conospermum undulatum* (R), *Eucalyptus marginata* subsp. *elegantella* (2), *Isopogon drummondii* (3), *Lambertia multiflora* var. *darlingensis* (3); *Dasypogon obliquifolius*, *Hakea conchifolia*, *Xanthorrhoea acanthostachya*

Fauna: no systematic survey. Significant mammal species: Quenda (Friend 1996 D)

Linkage: adjacent bushland to the north through road reserve and canopy to the Darling Range Regional Park (DPUD 1993) and south; part of proposed Greenway 116 (Tingay, Alan & Associates 1997a); part of a regionally significant contiguous bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: 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, Rarity

Opportunities and/or Constraints

Opportunities: Bushplan Site/part Bushplan Site subject to Swan and Canning Rivers EPP; location of Declared Rare Flora; under TPS Landscape Zoning; Crown Reserve

Constraints: private land

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s).

GREATER BRIXTON STREET WETLANDS, KENWICK

Boundary Definition: protected area/bushland (part taken to cadastre)/management 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. 387 **Map no.** 63 **Map sheet series ref. no.** 2033-I NE

System 6 (1983): M69 area of bushland goes beyond System area boundaries, all bushland described

Other Names

Brixton Street Wetlands, Kenwick Swamp/Yule Brook Reserve, Submission Areas 16 and 227, Locations 62-65 (Keighery, BJ, and Trudgen 1992)

Local Authorities (Suburb)

Shire of Kalamunda (Wattle Grove), City of Gosnells (Kenwick)

Area (ha): total 180.9; bushland 126.7

Zoning

MRS: Public Purposes-Special Uses, Parks and Recreation, Railways, Controlled Access Highways
TPS: Landscape, Residential A, Residential B, Rural, Shops and Local Business, Watercourses



Ownership Categories

State Government, Local Government, Private (including commercial organisation)

Lot/Location/Reserve numbers (Purpose), Street name

(Creekline lots not identified)
 9, 10, 11, 48, 77, 78 Bickley Rd; 1, 12, 13, 15, 17, 19, 23, 25, 27, 29, 31 Boundary Rd; 14, 16, 20, 22, 24, 26, 28, 30, 32 Brook Rd; 134, 135, 139, 140 Brentwood Rd; 9 Albany Hwy; 1, 35, 37, 47 Brixton St; 106 Wanaping Rd; 36, 340, 341 Welshpool Rd; 0 Tonkin Hwy; 342, 343 street not identified

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Pinjarra Plain

Guildford Formation (Qpa: Cs, Sc)

Bassendean Dunes

Bassendean Sands (Qpb: S8)

Bassendean Dunes/Pinjarra Plain

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

VEGETATION AND FLORA

Vegetation Complexes

Pinjarra Plain

Guildford Complex

Combinations of Bassendean Dunes/Pinjarra Plain

Southern River Complex

Floristic Community Types

Supergroup 1: Foothills/Pinjarra Plain

3a *Eucalyptus calophylla* — *Kingia australis* woodlands on heavy soils

Supergroup 2: Seasonal Wetlands

7 Herb-rich saline shrublands in clay pans

8 Herb-rich shrublands in clay pans

10a Shrublands on dry clay flats (most northern representation, except for outlier at Lake Pinjar)

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau

21c Low lying *Banksia attenuata* woodlands or shrublands

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

WETLANDS

Wetland Types: sumpland, palusplain, artificial channel

Natural Wetland Groups

Pinjarra Plain

Keysbrook (P.1)

Bassendean—Pinjarra transition OR Bassendean with fluvial features

Mungala (B/P.2)

Wetland Management Objectives: Conservation (155.9ha), Resource Enhancement

Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Not assessed, Critically Endangered (floristic community type 3a), Endangered (floristic community type 10a), Vulnerable (floristic community types 7, 8)

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated wetland (including claypans), creek (Yule Brook), vegetated uplands

Vegetation and Flora: limited survey (DEP 1996, Gibson *et al.* 1994 (Brix 01–05, Yule 0–05), part Bushplan Site — Hames Sharley Australia 1991a, Mattiske and Assoc. 1992); detailed survey (part Bushplan Site — Goble-Garratt 1991, Keighery, GJ, and Keighery 1991, Keighery, GJ, 1993a, Keighery, BJ, and Keighery 1995, Keighery, BJ, 1995b, Keighery, BJ, 1995d, Speck and Baird 1984)

Structural Units: mapping (Goble-Garratt 1991, Hames Sharley 1991a, Mattiske and Assoc. 1992, Speck and Baird 1984)

Uplands: *Eucalyptus calophylla* Open Forest to Woodland; *Banksia attenuata* and *B. menziesii* Low Woodland

Wetlands: *Eucalyptus calophylla* Woodland; *Viminaria juncea* Tall Shrubland; *Melaleuca* Tall Shrublands to Closed Tall Scrub dominated by *Melaleuca viminea*, *Melaleuca raphiophylla*, *M. uncinata*, *M. cuticularis* and

combinations of these; *Actinostrobilus pyramidalis* Closed Tall Scrub to Shrubland; Closed Heaths to Shrublands dominated by *Regelia ciliata*, *Kunzea recurva*, *Melaleuca lateritia*, *Pericalymma ellipticum* and *Astartea* sp. Brixton; *Verticordia* species and *Calytrix breviseta* subsp. *breviseta* Low Open Heath; mixed Open Low Heaths to Shrublands; *Halosarcia indica* Low Shrubland; Herblands dominated by *Borya* species, *Tribonanthes* species, *Stylidium* species and others in combination; Sedgeland dominated by *Leptocarpus canus*, *L. aristatus*, *L. coangustatus*, *Restio tremulus*, *Cyathochaeta avenacea*, *Lepidosperma rostratum* and combinations of these; *Amphibromus neesii* Grassland

Scattered Native Plants: *Banksia attenuata* and *B. menziesii* Low Woodland; *Melaleuca viminea* and *Melaleuca raphiophylla* Closed Tall Scrub - regionally significant vegetation recognised as being included in the area of Bushplan Site in need of protection

Vegetation Condition: >75% Excellent to Very Good, <25% Good to Degraded, with areas of severe localised disturbance

Total Flora: >518 native taxa (Keighery, GJ, 1993a) (estimated >80% expected flora)

Significant Flora: *Eleocharis keigheryi* (R), *Andersonia gracilis* (R), *Calytrix breviseta* subsp. *breviseta* (R), *Diuris purdiei* (R), *Lepidosperma rostratum* (R), *Hydatella dioica* (R), *Acacia lasiocarpa* var. *bracteolata* (1), *Schoenus pennisetis* (1), *Comesperma rhadinocarpum* (2), *Eryngium pinnatifidum* subsp. *palustre* ms (2), *Baeckea tenuifolia* (3), *Chamaescilla* sp Ellen Brook (GJK 12501) (3), *Stylidium mimeticum* (3), *Rhodanthe pyrethrum* (3), *Haemodorum loratum* (3), *Triglochin stowardii* (2), *Schoenus capillifolius* (2), *Schoenus benthamii* (3), *Schoenus* sp Waroona (GJK 12235) (3), *Synaphea acutiloba* (3), *Trichocline* sp. Treeton (BJK and NG 564) (3), *Anthotium junciforme* (4), *Aponogeton hexatepalus* (4), *Grevillea thelemanniana* (4), *Hydrocotyle lennoides* (4), *Verticordia lindleyi* subsp. *lindleyi* (4), *Villarsia submersa* (4); *Pimelea imbricata* var. *major*, *Stylidium roseo-alatum*; at least 80 significant taxa are found on the Bushplan Site of which 30 are restricted in their natural distribution, 16 are endemic to the eastern side of the Swan Coastal Plain, 45 are normally associated with the Darling Scarp or Plateau and 15 are at the southern or northern limit of their ranges

6 rare species

Fauna: multiple and structured surveys by Western Australian Museum of Natural Science for birds (41) (Dell 1995), native mammals (1), reptiles (19) and amphibians (5) (How and Dell 1994). Significant bird species: category 3 (1) and category 4 (4). Significant mammal species: Quenda (Friend 1996 D). Significant reptile species: Rosenberg's Goanna (*Varanus rosenbergi*), Gould's Goanna (*V. gouldii*), legless lizard (*Pletholax gracilis*) and a dragon (*Tympanocryptis adelaidensis*)

Linkage: adjacent bushland/canopy to the east (across Welshpool Road to Hartfield Park) and west; part of proposed Greenways 84, 116, 120 (Tingay, Alan & Associates 1997a); part of a regionally significant fragmented bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: Outstanding flora diversity with at least 518 native taxa (a third of the taxa recorded for the Swan Coastal Plain); nominated for Register of the National Estate; recommended to be managed as a flora conservation area (Keighery, BJ, and Trudgen 1992); recommended to be designated as the Yule Brook Nature Reserve (Conservation Council of WA 1994); an area of long-term research studies and a reference area for identification of flora of the eastern side of the Swan Coastal Plain; Planning Control Area (WAPC/142 24-9-1996); Threatened or Poorly Reserved Plant Community (EPA 1994 GIS); majority Bushplan Site Category One and Two Areas 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

Directory of Important Wetlands in Australia; Interim List of the Register of the National Estate

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, Planning Control Area No. 35

Constraints: private land; under MRD regional road requirements

Recommendation: The existing care, control and management intent of the University of Western Australia-managed 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. The remainder of the Bushplan Site to be reserved for Parks and Recreation in the Metropolitan Region Scheme and be purchased for National Park, Conservation Park, Nature Reserve or Regional Park.



KENWICK ROAD BUSHLAND, KENWICK

Boundary Definition: bushland (part taken to zoning) boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 422 **Map no.** 63 **Map sheet series ref. no.** 2033-I NE

Other Names: not known

Area (ha): total 1.1; bushland 0.8

Local Authorities (Suburb)

Zoning

City of Gosnells (Kenwick)

MRS: Urban

TPS: Civic and Cultural, Parks and Recreation, Residential A

Ownership Categories

Lot/Location/Reserve numbers (Purpose),

Local Government

Street name

1, 7, 51 Kenwick Rd

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Pinjarra Plain

Guildford Formation (Qpa: Cs)

Bassendean Dunes/Pinjarra Plain

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

VEGETATION AND FLORA

Vegetation Complexes

Pinjarra Plain

Guildford Complex

Floristic Community Types: *not sampled, types inferred

Supergroup 2: Seasonal Wetlands

*7 Herb-rich saline shrublands in clay pans

*8 Herb-rich shrublands in clay pans

WETLANDS

Wetland Types: sumpland (includes types not previously described, DEP 1998)

Natural Wetland Groups

Bassendean—Pinjarra transition OR Bassendean with fluvial features

Mungala (B/P.2)

Wetland Management Objectives: Conservation (DEP 1998)

Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Vulnerable (floristic community types 7, 8)

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated wetland

Vegetation and Flora

Structural Units: limited survey (DEP 1998)

Wetlands: *Viminaria juncea* Tall Shrubland; *Verticordia densiflora* Low Open Heath; Sedgeland dominated by *Leptocarpus canus*, *L. aristatus*, *L. coangustatus* and *Eleocharis keigheryi*

Vegetation Condition: >75% Very Good to Excellent, <25% Good to Degraded, with areas of severe localised disturbance

Total Flora: not known

Significant Flora: *Eleocharis keigheryi* (R), *Aponogeton hexatepalus* (4)

Fauna: no systematic survey. Significant mammal species: Quenda (Friend 1996 D)

Linkage: adjacent bushland to the west (cleared 1997)

Other Special Attributes: 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, 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 TPS Parks and Recreation Zoning

Constraints: under MRS Urban zoning

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.

WHITE ROAD BUSHLAND, ORANGE GROVE

Boundary Definition: bushland (part taken to cadastre) 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. 51 **Map no. 64** **Map sheet series ref. no. 2133-IV NW**

Other Names

Location 59 (Keighery, BJ, and Trudgen 1992); part Gosnells remnant bushland area 59 (Trudgen and Keighery 1995)

Local Authorities (Suburb)

City of Gosnells (Orange Grove)

Area (ha): total 7.8; bushland 4.3

Zoning

MRS: Rural

TPS: Rural

Ownership Categories

Private

Lot/Location/Reserve numbers (Purpose),

Street name

27, 28, 29, 30 White Rd

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Foothills

Yoganup Formation (Qpr: S12)

VEGETATION AND FLORA

Vegetation Complexes

Foothills

Forrestfield Complex (Ridge Hill Shelf, Darling Plateau)

Floristic Community Types: *not sampled, types inferred

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau

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

WETLANDS

No wetlands mapped

THREATENED ECOLOGICAL COMMUNITIES

Endangered (floristic community type 20a)

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated uplands

Vegetation and Flora: limited survey (Keighery, BJ, and Trudgen 1992, Matiske Consulting Pty. Ltd. 1997, Trudgen and Keighery 1995)

Structural Units: mapping (Keighery, BJ, and Trudgen 1992)

Uplands: *Banksia attenuata* and *B. menziesii* Low Woodland over species-rich Open Heath

Vegetation Condition: >90% Excellent to Very Good

Total Flora: not known

Significant Flora: *Conospermum undulatum* (R), *Isopogon drummondii* (3), *Lambertia multiflora* var. *darlingensis* (3)

Fauna: no systematic survey. Significant mammal species: Quenda (Friend 1996 D)

Linkage: adjacent bushland to the north (worthy of protection) and east; part of a regionally significant contiguous bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: 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, Rarity

Opportunities and/or Constraints

Opportunities: Bushplan Site/part Bushplan Site subject to Swan and Canning Rivers EPP; location of Declared Rare Flora

Constraints: private land; under General Mineral Resource Area (clay)

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s).

CLIFFORD STREET BUSHLAND, MADDINGTON

Boundary Definition: bushland taken to cadastre boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 53 Map no. 64 Map sheet series ref. no. 2033-I NE, 2133-IV NW

Other Names

Location 60 (Keighery, BJ, and Trudgen 1992)

Local Authorities (Suburb)

City of Gosnells (Maddington)

Area (ha): total 8.26; bushland 7.74

Zoning

MRS: Rural, Controlled Access Highways

TPS: Landscape, Rural

Ownership Categories

State Government

Lot/Location/Reserve numbers (Purpose),

Street name

108, 109, 110, 4069 Clifford St

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Pinjarra Plain

Guildford Formation (Qpa: Cs)

Bassendean Dunes

Bassendean Sands (Qpb: S8)

VEGETATION AND FLORA

Vegetation Complexes

Foothills

Forrestfield Complex (Ridge Hill Shelf, Darling Plateau)

Pinjarra Plain

Guildford Complex

Floristic Community Types: *not sampled, types inferred

Supergroup 1: Foothills/Pinjarra Plain

*3b *Eucalyptus calophylla* — *E. marginata* woodlands on sandy clay soils

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau

*20b Eastern *Banksia attenuata* and/or *Eucalyptus marginata* woodlands

WETLANDS

Wetland Types: palusplain

Natural Wetland Groups

Bassendean—Pinjarra transition OR Bassendean with fluvial features

Mungala (B/P.2)

Wetland Management Objectives: Conservation (2.2ha)

Swan Coastal Plain Lakes EPP: none identified



THREATENED ECOLOGICAL COMMUNITIES

Endangered (floristic community type 20b), Vulnerable (floristic community type 3b)

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated wetland, vegetated uplands

Vegetation and Flora: limited survey (Keighery, BJ, and Trudgen 1992, Mattiske Consulting Pty Ltd 1997)

Structural Units: mapping (Keighery, BJ, and Trudgen 1992)

Uplands: *Allocasuarina fraseriana* Low Open Woodland; *Eucalyptus calophylla* Woodland; Mixed Open Shrubland; *Eucalyptus calophylla* and *Eucalyptus wandoo* Woodland

Wetlands: Mixed Open Shrubland

Scattered Native Plants: not assessed

Vegetation Condition: >60% Excellent to Very Good, <40% Good to Degraded, with severe localised disturbance

Total Flora: not known

Significant Flora: *Conospermum undulatum* (R), *Lambertia multiflora* var. *darlingensis* (3)

Fauna: no systematic survey. Significant mammal species: Quenda (Friend 1996 D)

Linkage: no adjacent bushland

Other Special Attributes: 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, 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 wetland; under TPS Landscape Zoning, Crown Reserve

Constraints: under MRD regional road requirements, General Mineral Resource Area (clay)

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s).

MARY CARROLL PARK AND ADJACENT BUSHLAND, GOSNELLS

Boundary Definition: bushland (part taken to cadastre)/conservation wetland boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 124 **Map no.** 69, 70 **Map sheet series ref. no.** 2033-I NE, 2133-IV NW

System 6 (1983): M76 Part System area bushland, only bushland described

Other Names

Location 51 (Keighery, BJ, and Trudgen 1992); Gosnells remnant bushland area 28 (Trudgen and Keighery 1995)

Local Authorities (Suburb)

City of Gosnells (Gosnells)

Area (ha): total 21.4 (includes open water); bushland 6.5

Zoning

MRS: Urban

TPS: Landscape, Residential A, Residential B, Parks and Recreation, Public Purposes

Lot/Location/Reserve numbers (Purpose),

Street name

91 Barcombe Wy; 108, 2460 Eudoria St; 2499, 3933 May St; 3188 Verna St; 2096 Clara St; 3, 2899, 3934 Percy St; 23 Coulston Way; 418 street not identified Crown Reserve

Ownership Categories

Local Government, Private (commercial organisation)

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Bassendean Dunes

Bassendean Sands (Qpb: S8)

Wetlands (within the Bassendean Dunes)

Holocene Swamp Deposits (Qrw: Sp2)

VEGETATION AND FLORA

Vegetation Complexes

Foothills

Forrestfield Complex (Ridge Hill Shelf, Darling Plateau)

Floristic Community Types: *not sampled, types inferred

Supergroup 2: Seasonal Wetlands

*12 *Melaleuca teretifolia* and/or *Astartea* aff. *fascicularis* shrublands

WETLANDS

Wetland Types: lake

Natural Wetland Groups

Bassendean—Pinjarra transition OR Bassendean with fluvial features

Mungala (B/P.2)

Bennet Brook (B/P.4)

Wetland Management Objectives: Conservation (13.5ha), Resource Enhancement

Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Not assessed

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: open water, vegetated wetlands, vegetated uplands

Vegetation and Flora: limited survey (EPA and WAWA 1990, Keighery, BJ, and Trudgen 1992, Trudgen and Keighery 1995)

Structural Units: mapping (EPA and WAWA 1990)

Uplands: *Banksia menziesii* and *B. attenuata* Low Open Woodland

Wetlands: *Eucalyptus rudis* Open Forest to Woodland; *Melaleuca raphiophylla* Low Closed Forest to Woodland;

Eucalyptus calophylla and *Melaleuca preissiana* Woodland; *M. teretifolia* Closed Scrub to High Open Shrubland;

Baumea articulata Sedgeland

Vegetation Condition: Very Good to Degraded, with areas of severe localised disturbance

Total Flora: not known

Significant Flora: none recorded

Fauna: surveyed by RAOU (1996 D), 2 visits, and others for birds (46). Important feeding area for large assemblage of waterbirds including Blue-billed, Musk and Hardhead Ducks. Significant bird species: category 3 (5) and category 4 (2)

Linkage: no adjacent bushland

Other Special Attributes: 'Wetland of special note' (Payne 1993b), 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, 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

Opportunities and/or Constraints

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

Constraints: private land; under MRS Urban Zoning

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.

CONNELL AVENUE BUSHLAND, KELMSCOTT

Boundary Definition: protected area boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 61 **Map no.** 70 **Map sheet series ref. no.** 2133-IV NW

Other Names **Area (ha):** total 20.4; bushland 19.9

Submission Area 243 and 273; Location 48 (Keighery, BJ, and Trudgen 1992)

Local Authorities (Suburb)

City of Armadale (Kelmescott)

Zoning

MRS: Parks and Recreation

TPS: Landscape

Lot/Location/Reserve numbers (Purpose),

Street name

290 Connell Ave; 290 Turner Rd

Ownership Categories

State Government

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Foothills

Colluvial Deposits (Qc: Csg)

Yoganup Formation (Qpr: S12)

VEGETATION AND FLORA

Vegetation Complexes

Foothills

Forrestfield Complex (Ridge Hill Shelf, Darling Plateau)

Pinjarra Plain

Swan Complex

Floristic Community Types: *not sampled, types inferred (wetland unit unable to be inferred)

Supergroup 1: Foothills/Pinjarra Plain

*S8 *Eucalyptus wandoo* woodlands (Scarp)

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau

*20b Eastern *Banksia attenuata* and/or *Eucalyptus marginata* woodlands

WETLANDS

Wetland Types: dampland (includes wetlands not previously described, Keighery, BJ, and Trudgen 1992)

Wetland Management Objectives: Conservation

THREATENED ECOLOGICAL COMMUNITIES

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

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated uplands, vegetated wetland

Vegetation and Flora: limited survey (DEP 1998, Keighery, BJ, and Trudgen 1992)

Structural Units: mapping (Keighery, BJ, and Trudgen 1992)

Uplands: *Eucalyptus marginata* and *Allocasuarina fraseriana* Woodland; *Eucalyptus wandoo* Low Open Woodland; *Jacksonia sternbergiana* Open Scrub

Wetlands: *Eucalyptus rudis* Woodland over *Melaleuca preissiana* Open Forest; *Melaleuca raphiophylla* High Open Shrubland

Vegetation Condition: >75% Very Good to Excellent, <25 % Good to Degraded, with areas of severe localised disturbance

Total Flora: not known

Significant Flora: *Eucalyptus marginata* subsp. *elegantella* (2)

Fauna: no known information

Linkage: adjacent bushland east to the Darling Range Regional Park (DPUD 1993) and west, bushland/canopy to the Canning River (BS246); part of a regionally significant contiguous bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: One of a few areas in the PMR where the Plain and the Darling Scarp and Plateau meet through naturally vegetated areas; recommended to be managed as a flora conservation area (Keighery, BJ, and Trudgen 1992); Threatened or Poorly Reserved Plant Community (EPA 1994 GIS); included in Darling Range

Regional Park (MfP 1995); Category Two 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, 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

Opportunities and/or Constraints

Opportunities: Bushplan Site subject to Swan and Canning Rivers EPP; under MRS Parks and Recreation Reservation and TPS Landscape Zoning

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s). This Bushplan Site is reserved for Parks and Recreation in the Metropolitan Region Scheme — it should be made a Crown Reserve with a conservation purpose.

BOB BLACKBURN RESERVE BUSHLAND, ARMADALE

Boundary Definition: bushland (part taken to cadastre) boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 62 **Map no.** 76, 77 **Map sheet series ref. no.** 2033-I SE, 2133-IV SW

Other Names

Submission Area 166; Location 41 (Keighery, BJ, and Trudgen 1992)

Local Authorities (Suburb)

City of Armadale (Armadale)

Ownership Categories

Local Government, State Government

Area (ha): total 5.2; bushland 5.1

Zoning

MRS: Urban

TPS: Residential, Landscape

Lot/Location/Reserve numbers (Purpose),

Street name

3560 Williams Rd; 32 Champion Dr; 3560 Challis Rd.

Crown Reserve

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Pinjarra Plain

Guildford Formation (Qpa: Cs)

Bassendean Dunes

Bassendean Sands (Qpb: S8)

Bassendean Dunes/Pinjarra Plain

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

VEGETATION AND FLORA

Vegetation Complexes

Foothills

Forrestfield Complex (Ridge Hill Shelf, Darling Plateau)

Pinjarra Plain

Guildford Complex

Floristic Community Types: *not sampled, types inferred.

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau

*20b Eastern *Banksia attenuata* and/or *Eucalyptus marginata* woodlands

WETLANDS

No wetlands mapped

THREATENED ECOLOGICAL COMMUNITIES

Endangered (floristic community type 20b)



SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated uplands

Vegetation and Flora: limited survey (Keighery, BJ, and Trudgen 1992)

Structural Units: mapping (Keighery, BJ, and Trudgen 1992)

Uplands: *Eucalyptus calophylla*, *E. marginata* and *Banksia attenuata* Woodland

Vegetation Condition: >75% Very Good to Excellent, <25% Good, with areas of severe localised disturbance

Total Flora: not known

Significant Flora: *Lambertia multiflora* var. *darlingensis* (S. Wallace pers. com.)

Fauna: no systematic survey. Significant mammal species: Quenda (Friend 1996 D)

Linkage: no adjacent bushland

Other Special Attributes: part 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

Opportunities and/or Constraints

Opportunities: Bushplan Site/part Bushplan Site subject to Swan and Canning Rivers EPP; under TPS Landscape Zoning, Crown Reserve

Constraints: under MRS Urban Zoning

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.

LAMBERT LANE BUSHLAND, WUNGONG

Boundary Definition: bushland (part taken to cadastre)/bushland group 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. 264 **Map no.** 77 **Map sheet series ref. no.** 2133-IV SW

Other Names

Submission Area 269; Location 5 (Keighery, BJ, and Trudgen 1994)

Local Authorities (Suburb)

City of Armadale (Armadale, Brookdale)

Area (ha): total 15.1; bushland 8.3

Zoning

MRS: Rural

TPS: Landscape, Parks and Recreation, Public Purposes, Rural

Ownership Categories

Local Government

Lot/Location/Reserve numbers (Purpose),

Street name

106 Stone St; 49, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97 Wilson St; 98 Lambert L

Crown Reserve

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Foothills

Colluvial Deposits (Qc: Csg)



VEGETATION AND FLORA

Vegetation Complexes

Foothills

Forrestfield Complex (Ridge Hill Shelf, Darling Plateau)

Floristic Community Types

Supergroup 1: Foothills/Pinjarra Plain

3a *Eucalyptus calophylla* — *Kingia australis* woodlands on heavy soils

Supergroup 2: Seasonal Wetlands

WETLANDS

Wetland Types: palusplain, creek

Natural Wetland Groups

Pinjarra Plain

Keysbrook (P.1)

Wetland Management Objectives: Conservation (11.8ha), Resource Enhancement, Multiple Use

Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Critically Endangered (floristic community type 3a)

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated upland, vegetated wetland

Vegetation and Flora: limited survey (Gibson *et al.* 1994 (Lamb 01-02), Keighery, BJ, and Trudgen 1992)

Structural Units: mapping (Keighery, BJ, and Trudgen 1992)

Upland: *Eucalyptus calophylla* and *E. lanepoolei* Low Open Woodland; *Eucalyptus calophylla* and *E. lanepoolei*

Low Open Woodland; mixed Open Low Heath

Wetlands: no known information

Vegetation Condition: >90% Excellent to Very Good, <10% Good to Degraded, with areas of severe localised disturbance

Total Flora: 107 native taxa (plot-generated list only)

Significant Flora: *Synaphea acutiloba* (3); *Lomandra spartea*, *Eucalyptus lane-poolei*

Fauna: no systematic survey. Significant mammal species: Quenda (Friend 1996 D)

Linkage: no adjacent bushland; part of proposed Greenways 12, 144 (Tingay, Alan & Associates 1997a)

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

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 conservation category wetlands; under TPS Landscape Zoning and Parks and Recreation Zoning, Crown Reserve

Constraints: under General Mineral Resource Area (shale)

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s). This may include — 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.

OSCAR BRUNS RESERVE, BYFORD

Boundary Definition: bushland (part taken to zoning) 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. 449	Map no. 84	Map sheet series ref. no. 2133-IV SW
Other Names		Area (ha): total 1.3; bushland 1.3 (based on boundary being determined to match bushland)
Location 2 (Keighery, BJ, and Trudgen 1992)		Zoning
Local Authorities (Suburb)		MRS: Rural, Other Major Highways
Shire of Serpentine-Jarrahdale (Darling Downs)		TPS: Landscape, Public Open Space
Ownership Categories		Lot/Location/Reserve numbers (Purpose),
Not identified		Street name
		61 South Western Hwy
		Crown Reserve

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Foothills

Colluvial Deposits (Qc: Csg)

VEGETATION AND FLORA

Vegetation Complexes

Foothills

Forrestfield Complex (Ridge Hill Shelf, Darling Plateau)

Pinjarra Plain

Guildford Complex

Floristic Community Types: *not sampled, types inferred

Supergroup 1: Foothills/Pinjarra Plain

*3c *Eucalyptus calophylla* — *Xanthorrhoea preissii* woodlands and shrublands

*S8 *Eucalyptus wandoo* woodlands (Scarp)

WETLANDS

No wetlands mapped

THREATENED ECOLOGICAL COMMUNITIES

Not assessed, Not determined, Critically Endangered (floristic community type 3c)

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated uplands

Vegetation and Flora: limited survey (Keighery, BJ, and Trudgen 1992)

Structural Units: mapping (Keighery, BJ, and Trudgen 1992)

Uplands: *Eucalyptus calophylla* and *E. wandoo* Woodland

Vegetation Condition: >50% Very Good to Good, <50% Degraded to Good, with areas of severe localised disturbance associated with past mining activity

Total Flora: not known

Significant Flora: *Lambertia multiflora* var. *darlingensis* (3); at least six taxa associated with the Darling Scarp and eastern side of the Swan Coastal Plain

Fauna: no known information

Linkage: no adjacent bushland; part of a regionally significant fragmented bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: 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, Rarity

Opportunities and/or Constraints

Opportunities: Bushplan Site/part Bushplan Site subject to Peel-Harvey Estuary EPP/SPP, Swan and Canning Rivers EPP; under TPS Landscape Zoning and Public Open Space Zoning, Crown Reserve

Constraints: under MRD regional road requirements, General Mineral Resource Area (shale)

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s).

ABERNETHY ROAD BUSHLAND, OAKFORD

Boundary Definition: management 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. 65

Map no. 83

Map sheet series ref. no. 2033-I SE

Other Names

Submission Area 282; Location 8 (Keighery, BJ, and Trudgen 1992)

Area (ha): total 28.7; bushland 11.8

Local Authorities (Suburb)

Shire of Serpentine-Jarrahdale (Oakford)

Zoning

MRS: Rural

TPS: Special Rural

Ownership Categories

Private

Lot/Location/Reserve numbers (Purpose),

Street name

0, 2 Abernethy Rd

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Pinjarra Plain

Guildford Formation (Qpa: Cs)

Bassendean Dunes/Pinjarra Plain

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

Lagoonal and estuarine Deposits (within the Bassendean Dunes/Pinjarra Plain)

Lagoonal deposits in Bassendean dunes (Qpw: S9)

VEGETATION AND FLORA

Vegetation Complexes

Pinjarra Plain

Beermullah Complex

Floristic Community Types: *not sampled, types inferred

Supergroup 1: Foothills/Pinjarra Plain

*3a *Eucalyptus calophylla* — *Kingia australis* woodlands on heavy soils

Supergroup 2: Seasonal Wetlands

*8 Herb-rich shrublands in clay pans

WETLANDS

Wetland Types: palusplain, artificial channel

Natural Wetland Groups

Pinjarra Plain

Keysbrook (P.1)

Wetland Management Objectives: Multiple Use, also Conservation and Resource Enhancement (DEP 1998)

Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Critically Endangered (floristic community type 3a), Vulnerable (floristic community type 8)

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated wetland, vegetated uplands

Vegetation and Flora: limited survey (DEP 1996, DEP 1998, Keighery, BJ, and Trudgen 1992)

Structural Units: mapping (Keighery, BJ, and Trudgen 1992)

Uplands: *Eucalyptus calophylla* Open Forest to Woodland

Wetlands: *Actinostrobos pyramidalis* and *Melaleuca* Tall Shrublands to Tall Open Scrub dominated by *Melaleuca viminea*, *Melaleuca lateriflora*, *Melaleuca uncinata*, *Melaleuca lateritia* and combinations of these; Closed to Open Heath dominated by *Kunzea recurva*, *Regelia ciliata* and *Pericalymma ellipticum*; Open Low Heath to Low Shrubland dominated by *Verticordia plumosa* var. *pleiobotrya* or *Baekea tenuifolia*; Herblands dominated by *Borya* species, *Tribonanthes* species, *Stylidium* species and others in combination; Sedgeland dominated by *Leptocarpus aristatus*, *L. canus* and *L. coangustatus* or combinations of these; *Lepidosperma longitudinale* Sedgeland; *Baumea juncea* Sedgeland



Scattered Native Plants: *Eucalyptus calophylla* Open Forest to Woodland, *Casuarina obesa* Low Open Woodland — regionally significant vegetation recognised as being included in the area of Bushplan Site in need of protection

Vegetation Condition: >50% Good, <50 % Degraded, with areas of severe localised disturbance

Total Flora: not known

Significant Flora: *Verticordia plumosa* var. *pleiobotrya* (R), *Eryngium subdecumbens* ms (1), *Baeckea tenuifolia* (3)

Fauna: no known information

Linkage: no adjacent bushland

Other Special Attributes: 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, General criteria for the protection of wetland, streamline and estuarine fringing and coastal vegetation

Opportunities and/or Constraints

Opportunities: Bushplan Site/part Bushplan Site location of Declared Rare Flora

Constraints: private land

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s).

BYFORD TO SERPENTINE RAIL/ROAD RESERVES AND ADJACENT BUSHLAND

Boundary Definition: management 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. 350, 365, **Map no.** 83, 84, 90, 96 **Map sheet series ref. no.** 2033-I SE, 2033-II NE, 2133-IV SW

Other Names

Bushplan Site includes Bella Cumming Reserve, Paul Robinson Park and Lambkin Reserve

Local Authorities (Suburb)

Shire of Serpentine-Jarrahdale (Byford, Mundijong, Serpentine)

Area (ha): total 169.6; bushland 33.1

Zoning

MRS: Urban, Rural, Parks and Recreation, Railways, Other Major Highways, Urban Deferred, Controlled Access Highways

TPS: Residential, Landscape, Commercial, Rural, Special Rural, Public Open Space, Public And Community Purposes

Lot/Location/Reserve numbers (Purpose),

Street name

106 Soldiers Rd; 0, 37, 38, 41, 103 South Western Hwy; 7 Richardson St; 122 Tonkin St; 778 Hall Rd; Crown; 1839 street not identified

Crown Reserve

Reserve 32352 (Preservation of Flora)

Ownership Categories

Private (including commercial organisation), Commonwealth Government, Local Government, State Government, Not identified

CALM Managed Land

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Foothills

Colluvial Deposits (Qc: Csg)

Pinjarra Plain

Guildford Formation (Qpa: Cs) (Qha: Msc1)

Alluvial/Colluvial Deposits (Qpo: FS1)



Bassendean Dunes

Bassendean Sands (Qpb: S8)

Bassendean Dunes/Pinjarra Plain

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

Wetlands (within the Bassendean Dunes/Pinjarra Plain)

Holocene Swamp Deposits (Qhw: Spc)

VEGETATION AND FLORA

Vegetation Complexes

Foothills

Forrestfield Complex (Ridge Hill Shelf, Darling Plateau)

Pinjarra Plain

Guildford Complex

Beermullah Complex (unmapped bushland, most southern occurrence)

Floristic Community Types *not sampled, types inferred

Supergroup 1: Foothills/Pinjarra Plain

*3a *Eucalyptus calophylla* — *Kingia australis* woodlands on heavy soils

*3b *Eucalyptus calophylla* — *E. marginata* woodlands on sandy clay soils

*3c *Eucalyptus calophylla* — *Xanthorrhoea preissii* woodlands and shrublands

Supergroup 2: Seasonal Wetlands

*2 Southern wet shrublands

*8 Herb-rich shrublands in clay pans

*9 Dense shrublands on clay flats

*10a Shrublands on dry clay flats

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau

*20b Eastern *Banksia attenuata* and/or *Eucalyptus marginata* woodlands

WETLANDS

Wetland Types: dampland, palusplain, creek, artificial channel

Natural Wetland Groups

Pinjarra Plain

Keysbrook (P.1)

Bassendean—Pinjarra transition OR Bassendean with fluvial features

Bennett Brook (B/P.4)

Swan Coastal Plain Rivers

Goegrup (R.4)

Wetland Management Objectives: Conservation (65.3ha, 64.8m), Resource Enhancement, Multiple Use, not assessed

Swan Coastal Plain Lakes EPP: none identified

THREATENED COMMUNITIES

Critically Endangered (floristic community type 3a, 3c), Endangered (floristic community type 2, 10a, 20b), Vulnerable (floristic community type 3b, 8, 9)

SECTION 3: SPECIFIC SITE DETAIL (Bushplan Site described in parts)

Soldiers Road (BS350, BS365 - road and rail reserve from Byford to Serpentine)

Landscape Features: vegetated wetland, creek, vegetated uplands

Vegetation and Flora: detailed survey (part Bushplan Site — Byford to Mundijong, Keighery, BJ, 1996c)

Structural Units: mapping (part Bushplan Site — Byford to Mundijong, Keighery, BJ, 1996c)

Uplands: *Eucalyptus calophylla* Forest to Woodland; *Eucalyptus marginata* subsp. *elegantella*, *E. calophylla* and *E. lanepolei* Low Forest to Woodland; *Eucalyptus marginata* subsp. *elegantella*, *Banksia attenuata* and *B. menziesii* Woodland

Wetlands: *Eucalyptus rudis* Forest to Woodland; *Pericalymma ellipticum* Open Heath; mixed Open Heath; *Viminaria juncea* Tall Shrubland; *Melaleuca viminea*, *Melaleuca lateriflora* and *Viminaria juncea* Open Scrub

Scattered Native Plants: areas of canopy only or few scattered native plants — regionally significant vegetation recognised as being included in the area of Bushplan Site in need of protection

Vegetation Condition: >50% Excellent to Very Good, <50% Good to Completely Degraded, with areas of severe localised disturbance (mapped in Keighery, BJ, 1996c from Byford to Mundijong)

Total Flora: 144 native taxa (Keighery, BJ, 1996c) (estimated >60% expected flora based on Byford to Mundijong area)

Significant Flora: *Eryngium pinnatifidum* subsp. *palustre* (2), *Anthotium junciforme* (4), *Drosera occidentalis* (4), *Aristida ramosa* (1), *Eucalyptus marginata* subsp. *elegantella* (2)

Bella Cumming Reserve (part BS350 in Mundijong Townsite)

Landscape Features: vegetated uplands

Vegetation and Flora: detailed survey (Keighery, BJ, 1996c); limited survey (Keighery, BJ, and Trudgen 1992)

Structural Units: mapping (Keighery, BJ, 1996c)

Uplands: *Eucalyptus marginata*, *Banksia attenuata*, *B. menziesii*, *B. grandis* and *Allocasuarina fraseriana*
Woodland to Open Woodland

Vegetation Condition: Excellent to Very Good (Keighery, BJ, 1996c)

Total Flora: 102 native taxa (Keighery, BJ, 1996c) (estimated 85% expected flora)

Significant Flora: none recorded

Lambkin Reserve and bushland in Paul Robinson Park/Serpentine Golf Course (BS375)

Landscape Features: vegetated wetland, vegetated uplands

Vegetation and Flora: detailed survey (Keighery, GJ, and Keighery 1996); limited survey (DEP 1996 (xLamb 01), DEP 1998)

Structural Units: mapping (Keighery, GJ, and Keighery 1996)

Uplands: *Eucalyptus marginata* subsp. *elegantella* and *E. calophylla* Woodland

Wetlands: *Melaleuca raphiophylla* Low Forest; *Kunzea recurva* and *Pericalymma ellipticum* Open to Closed Low Heath; Herbland; Sedgeland

Vegetation Condition: >60% Very Good to Excellent, <40% Good to Degraded, with areas of severe localised disturbance

Total Flora: 136 native taxa (Keighery, GJ, and Keighery 1996) (>85% expected flora)

Significant Flora: *Tetraria australiensis* (R), *Eucalyptus marginata* subsp. *elegantella* (2), *Lomandra sonderi*

Fauna: no systematic survey. Significant mammal species: Quenda (Friend 1996 D)

Linkage: adjacent bushland to the east (BS361, BS354, BS362 and BS371) and west (BS321, BS352 and BS371); part of proposed Greenways 120, 81, 82, 92 (Tingay, Alan & Associates 1997a); BS350 and BS365 are part of a regionally significant fragmented bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: Soldiers Road recognised as an important flora road by the Shire of Serpentine-Jarrahdale (Shire of Serpentine-Jarrahdale 1992, Keighery, BJ, 1996c); contains a north—south transect of 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 Peel-Harvey Estuary EPP/SPP; location of Declared Rare Flora, conservation category wetlands; under MRS Parks and Recreation Reservation and TPS Public Open Space Zoning and Landscape Zoning, Crown Reserve

Constraints: private land; under MRS Urban Zoning and Urban Deferred Zoning, MRD regional road requirements, General Mineral Resource Area (shale and clay)

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s). This may include — 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.

BRICKWOOD RESERVE AND ADJACENT BUSHLAND, BYFORD

Boundary Definition: protected area/bushland (part taken to cadastre) boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 321 **Map no.** 83, 84 **Map sheet series ref. no.** 2033-I SE, 2133-IV SW

Other Names

Location 10 (Keighery, BJ, and Trudgen 1992)

Local Authorities (Suburb)

Shire of Serpentine-Jarrahdale (Byford)

Ownership Categories

Private (including commercial organisation), Not identified

Area (ha): total 57.1; bushland 44.9

Zoning

MRS: Parks and Recreation, Urban

TPS: Landscape, Rural, Public Open Space, Public and Community Purposes

Lot/Location/Reserve numbers (Purpose), Street name

104 Soldiers Rd; 48, 104, 106, 107, 108 Turner Rd
Crown Reserve 17490 (Recreation)

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Foothills

Colluvial Deposits (Qc: Csg)

Pinjarra Plain

Guildford Formation (Qpa: Cs)

Bassendean Dunes

Bassendean Sands (Qpb: S8)

VEGETATION AND FLORA

Vegetation Complexes

Foothills

Forrestfield Complex (Ridge Hill Shelf, Darling Plateau)

Pinjarra Plain

Guildford Complex

Floristic Community Types

Supergroup 1: Foothills/Pinjarra Plain

3a *Eucalyptus calophylla* — *Kingia australis* woodlands on heavy soils

Supergroup 2: Seasonal Wetland

9 Dense shrublands on clay flats (most northerly representation)

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau

20b Eastern *Banksia attenuata* and/or *Eucalyptus marginata* woodlands

WETLANDS

Wetland Types: palusplain, creek

Natural Wetland Groups

Pinjarra Plain

Keysbrook (P.1)

Wetland Management Objectives: Conservation (17.7ha), Multiple Use

Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Not assessed, Critically Endangered (floristic community type 3a), Endangered (floristic community type 20b)

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated wetland, creek, vegetated uplands

Vegetation and Flora: detailed survey (part Bushplan Site - Keighery, GJ, and Keighery 1993a); limited survey (Gibson *et al.* 1994 (Brick 01-08), Keighery, BJ, and Trudgen 1992)

Structural Units: mapping (Keighery, GJ, and Keighery 1993a, Keighery, BJ, and Trudgen 1992)

Uplands: *Eucalyptus calophylla* and *E. marginata* Woodland; *Banksia attenuata* and *B. menziesii* Woodland

Wetlands: *Eucalyptus calophylla* Open Woodland; *Melaleuca viminea*, *M. lateriflora* and *Viminaria juncea* Scrub; *Pericalymma ellipticum* Closed Low Heath; mixed Herbland; *Leptocarpus coangustatus* and *Lepidosperma longitudinale* Sedgeland

Vegetation Condition: >80% Excellent to Very Good, <20% Good to Degraded, with areas of severe localised disturbance

Total Flora: 309 native taxa, 24 weeds (Keighery, GJ, and Keighery 1993a) (estimated >90% expected flora)

Significant Flora: *Schoenus pennisetis* (1), *Trichocline* sp. Treeton (BJK & NG 561) (2), *Stylidium mimeticum* (3), *Lambertia multiflora* var. *darlingensis* (3), *Drosera occidentalis* (4), *Verticordia lindleyi* subsp. *lindleyi* (4); *Isopogon asper*, *Stylidium utricularioides*, *Johnsonia* sp. (GJK 5249) (one of three known populations), *Eucalyptus lane-poolei* (one of the few patches on the Swan Coastal Plain), *Jacksonia gracilis*

Fauna: multiple and structured survey by Western Australian Museum of Natural Science (Harvey *et al.* 1997) for birds (28), native mammals (2), reptiles (12) and amphibians (5). Significant bird species: category 1 (1), category 3 (1), category 4 (4) including the Painted Button-quail. Significant mammal species: Quenda (Friend 1996 D and Harvey *et al.* 1997)

Linkage: adjacent bushland to the east (BS350); part of proposed Greenway 92 (Tingay, Alan & Associates 1997a); part of a regionally significant fragmented bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: Threatened or Poorly Reserved Plant Community (EPA 1994 GIS); recommended to be managed as a flora conservation area (Keighery, BJ, and Trudgen 1992); National Trust of Australia (WA) Classification; contains plant communities representative of the eastern side of the Swan Coastal Plain

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Interim List of the Register of the National Estate

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 Peel Inlet-Harvey Estuary EPP/SPP; location of Scheduled Fauna, conservation category wetlands; under MRS Parks and Recreation Reservation and TPS Landscape Zoning, Public Open Space Zoning, Crown Reserve

Constraints: private land; under MRS Urban Zoning

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. The most appropriate mechanism for the protection of the remainder of this Bushplan Site to be considered through the public comment period in consultation with the land owner(s).

CARDUP BROOK BUSHLAND, CARDUP/PEEL ESTATE

Boundary Definition: BS66 - bushland (part taken to cadastre) boundary; BS271 - bushland (part taken to cadastre) boundary; BS351 - management boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 66, 271, 351 **Map no.** 83, 84 **Map sheet series ref. no.** 2033-I SE, 2133-IV SW

Other Names

Location 7 (Keighery, BJ, and Trudgen 1992)

Local Authorities (Suburb)

Shire of Serpentine-Jarrahdale (Byford, Cardup)

Area (ha): total 50.0; bushland 42.0

Zoning

MRS: Urban, Urban Deferred, Rural, Controlled Access Highways

TPS: Rural, Special Rural, Special Use, Public Open Space, Drainage Purposes, Landscape

Lot/Location/Reserve numbers (Purpose),

Street name

(Creekline lots not identified)
236 Orton Rd; 7 Orton Rd; 8 Leaver Wy; 0, 1, 2, 3, 345,
521 South Western Hwy; 0, 1 Nettleton Rd; 0, 10, 50,
521 street not identified

Crown Reserve

Ownership Categories

Private (including commercial organisation), State Government, Commonwealth Government, Not identified

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Foothills

Colluvial Deposits (Qc: Csg)

Yoganup Formation (Qpr: S12)

Armada Shale (Pa: SH)

Pinjarra Plain

Guildford Formation (Qpa: Cs) (Qha: Msc1)

Bassendean Dunes/Pinjarra Plain

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

VEGETATION AND FLORA

Vegetation Complexes

Foothills

Forrestfield Complex (Ridge Hill Shelf, Darling Plateau)

Pinjarra Plain

Guildford Complex

Beermullah Complex

Floristic Community Types *not sampled, types inferred

Supergroup 1: Foothills/Pinjarra Plain

*3b *Eucalyptus calophylla* — *E. marginata* woodlands on sandy clay soils

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau

*20b Eastern *Banksia attenuata* and/or *Eucalyptus marginata* woodlands

*21a Central *Banksia attenuata* — *Eucalyptus marginata* woodlands

WETLANDS

Wetland Types: palusplain, creek

Natural Wetland Groups

Pinjarra Plain

Keysbrook (P.1)

Wetland Management Objectives: Conservation (13.2ha), Resource Enhancement, Multiple Use, not assessed

Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Not assessed, Endangered (floristic community type 20b), Vulnerable (floristic community type 3b)

SECTION 3: SPECIFIC SITE DETAIL

BS271

Landscape Features: vegetated wetland, creek, vegetated uplands

Vegetation and Flora: limited survey (DEP 1998, Tingay, Alan & Assoc. 1998)

Structural Units: mapping (Tingay, Alan & Assoc. 1998)

Uplands: *Eucalyptus calophylla* and *E. marginata* subsp. *elegantella* Woodlands; *Banksia attenuata* and *B. menziesii* Low Woodland

Wetlands: Woodlands dominated by *Eucalyptus rudis*, *E. calophylla* and *E. wandoo*

Scattered Native Plants: *Eucalyptus rudis*, *E. calophylla* and/or *E. wandoo* Woodland - included at the subdivision stage as buffer for creekline bushland

Vegetation Condition: >20% Excellent to Very Good, <70% Very Good to Good, with Degraded patches and areas of severe localised disturbance

Total Flora: 155 native taxa, 7 weeds (DEP 1998, Tingay, Alan & Assoc. 1998)

Significant Flora: DEP 1998 — *Aristida ramosa* (1), *Eucalyptus marginata* subsp. *elegantella* (2); at least 17 taxa representative of the eastern side of the Swan Coastal Plain found in the Site

Linkage: part of a regionally significant contiguous bushland/wetland linkage (Volume 2A, Map 8)

BS351

Landscape Features: creek

Vegetation and Flora: limited survey (Keighery, BJ, and Trudgen 1992)

Scattered Native Plants: *Eucalyptus calophylla* and *E. marginata* Open Woodland - part of a regionally significant contiguous bushland/wetland linkage

BS66

Landscape Features: creek

Vegetation and Flora: not known

Fauna: no known information

Linkage: no adjacent bushland; part of proposed Greenways 129, 92 (Tingay, Alan & Associates 1997a)

Other Special Attributes: 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, Rarity, 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 Peel-Harvey Estuary EPP/SPP; location of conservation category wetlands; under TPS Public Open Space Zoning and Landscape Zoning, Crown Reserve

Constraints: private land; under MRS Urban Zoning and Urban Deferred Zoning, MRD regional road requirements, Priority and General Mineral Resource Area (shale), mining tenements 29/248/1, 29/248/2, 29/698/2 (Bristle)

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s).

CARDUP NATURE RESERVE AND ADJACENT BUSHLAND CARDUP

Boundary Definition: protected area/bushland (part taken to cadastre) boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 352 **Map no.** 83, 90 **Map sheet series ref. no.** 2033-I SE, 2033-II NE
System 6 (1983): M83 area of bushland goes beyond System area boundaries, all bushland described

Other Names

Reserve C2457 Mundijong; Location 11 (Keighery, BJ, and Trudgen 1992)

Local Authorities (Suburb)

Shire of Serpentine-Jarrahdale (Cardup)

Ownership Categories

Private, State Government

Area (ha): total 89.7; bushland 86.2

Zoning

MRS: Parks and Recreation, Rural

TPS: Rural, Special Rural, Landscape

Lot/Location/Reserve numbers (Purpose),

Street name

701, 703, 704, 705, 706, 707, 708 Bushlark Cl; 17, 146, 154 Cardup Siding Rd; 1 Soldiers Rd

Crown Reserve

Reserve 2457 (Conservation of Flora and Fauna)

CALM Managed Land

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Foothills

Colluvial Deposits (Qc: Csg)

Pinjarra Plain

Guildford Formation (Qpa: Cs)

Bassendean Dunes

Bassendean Sands (Qpb: S8)

VEGETATION AND FLORA

Vegetation Complexes

Pinjarra Plain

Guildford Complex

Floristic Community Types

Supergroup 1: Foothills/Pinjarra Plain

3b *Eucalyptus calophylla* — *E. marginata* woodlands on sandy clay soils

Supergroup 2: Seasonal Wetlands

6 Weed dominated wetlands on heavy soils

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau

20b Eastern *Banksia attenuata* and/or *Eucalyptus marginata* woodlands

21a Central *Banksia attenuata* — *Eucalyptus marginata* woodlands



WETLANDS

Wetland Types: palusplain, creek, sumpland (wetland not previously described, Keighery, GJ, and Keighery 1993a)

Natural Wetland Groups

Pinjarra Plain

Keysbrook (P.1)

Wetland Management Objectives: Multiple Use, Conservation (Keighery, GJ, and Keighery 1993a), not assessed

Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Not assessed, Endangered (floristic community type 20b), Vulnerable (floristic community type 3b)

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated upland, vegetated wetland, creek

Vegetation and Flora: detailed survey (part Bushplan Site (Cardup Nature Reserve), Keighery, GJ, and Keighery 1993a); limited survey (Gibson *et al.* 1994 (Card 01-13), Keighery, BJ, and Trudgen 1992)

Structural Units: mapping (Keighery, GJ, and Keighery 1993a, Keighery, BJ, and Trudgen 1992)

Uplands: Woodlands dominated by *Eucalyptus calophylla* and/or *E. marginata*; *Banksia attenuata*, *B. menziesii* and *B. grandis* Woodland to Open Forest with scattered to co-dominant *Xylomelum occidentale* and *Nuytsia floribunda*; *Allocasuarina humilis*, *Hakea ruscifolia*, *Hibbertia hypericoides* Low Shrubland

Wetlands: *Melaleuca preissiana* Low Woodland; *Mesomelaena tetragona* and *Hypolaena exsulca* Sedgeland

Scattered Native Plants: not assessed

Vegetation Condition: >75% Excellent to Very Good, <25% Good to Degraded, with areas of severe localised disturbance

Total Flora: 253 native taxa, 47 weeds (Keighery, GJ, and Keighery 1993b) (estimated >90% expected flora)

Significant Flora: *Eryngium pinnatifidum* subsp. *palustre* ms (2), *Lambertia multiflora* var. *darlingensis* (3), *Drosera macrantha* (BJK and NG 228), *Johnsonia* aff. *pubescens* (GJK 5249), *Johnsonia* sp. (GJK 5249) (southern limit of distribution, known from only two other bushland areas), *Dasypogon obliquifolius* (most southern record), *Dasypogon obliquifolius*, *D. bromeliifolius* (co-occurrence of these two *Dasypogon* species is not common on the eastern side of the Swan Coastal Plain)

Fauna: multiple and structured survey by Western Australian Museum of Natural Science (Harvey *et al.* 1997) for birds (37), native mammals (1), reptiles (14) and amphibians (4). Significant bird species: category 1 (1), category 3 (6) and category 4 (6). Significant mammal species: Quenda

Linkage: adjacent canopy to the north and bushland east (BS350); part of proposed Greenways 129, 120 (Tingay, Alan & Associates 1997a); part of a regionally significant fragmented bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: Threatened or Poorly Reserved Plant Community (EPA 1994 GIS); contains plant communities representative of the eastern side of the Swan Coastal Plain; National Trust of Australia (WA) Classification

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Interim List of the Register of the National Estate

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 Peel-Harvey Estuary EPP/SPP; location of Scheduled Fauna; under MRS Parks and Recreation Reservation and TPS Landscape Zoning, Crown Reserve

Constraints: private land

Recommendation: The existing purpose, care, control and management of Reserve 2457 is endorsed. The most appropriate mechanism for the protection of the remainder of this Bushplan Site be considered through the public comment period in consultation with the land owner(s).



NORMAN ROAD BUSHLAND, WHITBY/CARDUP

Boundary Definition: BS354 - management boundary; BS361 - bushland (part taken to cadastre) boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 354, 361 **Map no.** 90, 91 **Map sheet series ref. no.** 2033-II NE, 2133-III NW

Other Names

Submission Area 187; Locations 16, 17 and 18
(Keighery, BJ, and Trudgen 1992)

Local Authorities (Suburb)

Shire of Serpentine-Jarrahdale (Whitby, Cardup)

Area (ha): total 248.8; bushland 113.6

Zoning

MRS: Rural, Urban Deferred, Parks and Recreation,
Other Major Highways

TPS: Landscape, Special Use, Rural

Lot/Location/Reserve numbers (Purpose),

Street name

29, 60 Robertson Rd; 22 Perrett Rd; 23 South Western Hwy; 21 Norman Rd

Ownership Categories

Private (including commercial organisation)

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Pinjarra Plain

Guildford Formation (Qpa: FS1, Cs)

Foothills

Colluvial Deposits (Qc: Csg)

Yoganup Formation (Qpr: S12)

VEGETATION AND FLORA

Vegetation Complexes

Foothills

Forrestfield Complex (Ridge Hill Shelf, Darling Plateau)

Pinjarra Plain

Guildford Complex

Floristic Community Types

Supergroup 1: Foothills/Pinjarra Plain

1a *Eucalyptus haematoxylon* — *E. marginata* woodlands on Whicher foothills (most northern occurrence, disjunct)

3b *Eucalyptus calophylla* — *E. marginata* woodlands on sandy clay soils

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau

20b Eastern *Banksia attenuata* and/or *Eucalyptus marginata* woodlands

WETLANDS

Wetland Types: palusplain, creek, artificial channel

Natural Wetland Groups

Darling Plateau

Little Dardanup (D.2)

Pinjarra Plain

Keysbrook (P.1)

Wetland Management Objectives: Conservation (0.1ha), Multiple Use and Conservation (length unknown, DEP 1996), not assessed

Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Not assessed, Endangered (floristic community type 20b), Vulnerable (floristic community type 3b)

SECTION 3: SPECIFIC SITE DETAIL

BS354

Landscape Features: vegetated upland, vegetated creek

Vegetation and Flora: limited survey (DEP 1996 (Norm 01-07), Keighery, BJ, and Trudgen 1992)

Structural Units: mapping (Keighery, BJ, and Trudgen 1992)

Uplands: *Eucalyptus calophylla* Open Forest to Woodland; *Eucalyptus marginata* subsp. *elegantella* Open Forest to open Woodland; *Banksia attenuata* and *B. menziesii* Low Woodland; *Eucalyptus lanepoolei* and *E. marginata* Open Forest

Wetlands: *Eucalyptus calophylla* Open Forest to Woodland (occasional *Eucalyptus rudis*)

Vegetation Condition: >90% Excellent to Very Good, <10% Good

Scattered Native Plants: *Eucalyptus calophylla* and *E. lanepoolei* Open Forest to Woodland - regionally significant vegetation recognised as being included in the area of Bushplan Site in need of protection

Total Flora: 155 native taxa, 18 exotic taxa (plot-generated list only)

Significant Flora: *Drakaea elastica* (R), *Tetraria australiensis* (R), *Eucalyptus marginata* subsp. *elegantella* (2), *Lambertia multiflora* var. *darlingensis* (3); *Xanthorrhoea acanthostachya*, *Patersonia babianoides*, *Dryandra kippistiana*, *Eucalyptus lanepoolei*, *Lomandra spartea*, *Trichocline spathulata*

Fauna: multiple and structured survey by Western Australian Museum of Natural Science (Harvey *et al.* 1997) for birds (20), native mammals (3), reptiles (11) and amphibians (4). Significant birds Scarlet Robin, Weebill, Yellow-rumped and Western Thornbills and Splendid Fairy-wren. Significant bird species: category 1 (1), category 3 (4) and category 4 (1). Significant mammal species: Pygmy Possum and Mardo

BS361

Landscape Features: vegetated upland

Vegetation and Flora: limited survey (DEP 1996)

Scattered Native Plants: *Eucalyptus calophylla* and *E. lanepoolei* Open Forest to Woodland over scattered native shrubs and herbs - regionally significant vegetation

Linkage: adjacent bushland/canopy along BS350 Byford to Serpentine Rail/Road Reserve, east along creek line to Darling Range Regional Park (DPUD 1993); part of proposed Greenways 92, 120 (Tingay, Alan & Associates 1997a); part of a regionally significant fragmented bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: part BS354 Threatened or Poorly Reserved Plant Community (EPA 1994 GIS); 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 Peel-Harvey Estuary EPP/SPP; location of Declared Rare Flora and Scheduled Fauna, conservation category wetland; under MRS Parks and Recreation Reservation and TPS Landscape Zoning

Constraints: private land; under MRS Urban Deferred Zoning, MRD regional road requirements, General Mineral Resource Area (shale), Titanium mineralisation subject to Exploration licence E70/323 (Westralian Sands Ltd)

Recommendation: Part of this Bushplan Site is already reserved for Parks and Recreation in the Metropolitan Region Scheme and should be set aside as a Conservation Park or Nature Reserve. The most appropriate mechanism for the protection of the remainder of this Bushplan Site be considered through the public comment period in consultation with the land owner(s).

JACKSON ROAD BUSHLAND, PEEL ESTATE

Boundary Definition: bushland (part taken to cadastre)/wetland (Swan Coastal Plain Lakes EPP) boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 68 **Map no.** 89 **Map sheet series ref. no.** 2033-II NE

Other Names

Locations 13 (Keighery, BJ, and Trudgen 1992)

Area (ha): total 24.7 (possibly includes open water); bushland 19.3

Local Authorities (Suburb)

Shire of Serpentine-Jarrahdale (Oldbury)

Zoning

MRS: Rural

TPS: Rural, Drainage Purposes, Landscape

Ownership Categories
Private (including commercial organisation)

**Lot/Location/Reserve numbers (Purpose),
Street name**
1, 11, 70, 71 Jackson Rd; 1, 2 Bird Rd; 54, 57 King Rd

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Pinjarra Plain

Guildford Formation (Qpa: CS, Sc)

Bassendean Dunes

Bassendean Sands (Qpb: S8)

Bassendean Dunes/Pinjarra Plain

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

Wetlands (within the Bassendean Dunes/Pinjarra Plain)

Holocene Swamp Deposits (Qhw: Spc)

VEGETATION AND FLORA

Vegetation Complexes

Pinjarra Plain

Serpentine River Complex (most northern occurrence)

Bassendean Dunes

Bassendean Complex - Central and South

Floristic Community Types: not sampled, types not inferred

Supergroup 2: Seasonal Wetlands

WETLANDS

Wetland Types: lake, palusplain, sumpland, artificial channel

Natural Wetland Groups

Pinjarra Plain

Keysbrook (P.1)

Wetland Management Objectives: Resource Enhancement, Multiple Use

Swan Coastal Plain Lakes EPP: 13.9 + 1.4 = 15.3 ha (total)

THREATENED ECOLOGICAL COMMUNITIES

Not determined

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: possibly includes open water, vegetated wetland

Vegetation and Flora: limited survey (Keighery, BJ, and Trudgen 1992, Mattiske Consulting Pty. Ltd. 1997)

Structural Units

Wetlands: *Eucalyptus rudis* Open Forest

Scattered Native Plants: not assessed

Vegetation Condition: Very Good to Degraded

Total Flora: not known

Significant Flora: none recorded

Fauna: no systematic survey. Significant mammal species: Quenda (Friend 1996 D)

Linkage: adjacent bushland to the south and west; part of a regionally significant potential bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: 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, Rarity, 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 Peel-Harvey Estuary EPP/SPP, Swan Coastal Plain Lakes EPP; under TPS Landscape Zoning

Constraints: private land; under General Mineral Resource Area (clay)



Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s).

ROMAN ROAD BUSHLAND, WHITBY

Boundary Definition: bushland (part taken to cadastre) boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 362 **Map no.** 90 **Map sheet series ref. no.** 2033-II NE

Other Names

Location 20 (Keighery, BJ, and Trudgen 1992), part
Submission Area 180

Local Authorities (Suburb)

Shire of Serpentine-Jarrahdale (Mundijong)

Area (ha): total 10.5; bushland 8.4

Zoning

MRS: Urban, Urban Deferred

TPS: Landscape, Rural

Lot/Location/Reserve numbers (Purpose),

Street name

1, 2 Roman Rd; 548 Galvin Rd; 1 Keirnan St; 10 street
not identified

Crown Reserve

Ownership Categories

Private (including commercial organisation), Not
identified

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Pinjarra Plain

Guildford Formation (Qpa: CS)

Bassendean Dunes/Pinjarra Plain

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

VEGETATION AND FLORA

Vegetation Complexes

Foothills

Forrestfield Complex (Ridge Hill Shelf, Darling Plateau)

Floristic Community Types: *not sampled, types inferred

Supergroup 1: Foothills/Pinjarra Plain

*3a *Eucalyptus calophylla* — *Kingia australis* woodlands on heavy soils

*3c *Eucalyptus calophylla* — *Xanthorrhoea preissii* woodlands and shrublands

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau

*20b Eastern *Banksia attenuata* and/or *Eucalyptus marginata* woodlands

WETLANDS

Wetland Types: palusplain

Natural Wetland Groups

Pinjarra Plain

Keysbrook (P.1)

Wetland Management Objectives: Conservation (2.7ha), Multiple Use

Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Critically Endangered (floristic community type 3a, 3c), Endangered (floristic community type 20b)

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated wetland, vegetated uplands

Vegetation and Flora: limited survey (Keighery, BJ, and Trudgen 1992)

Structural Units: mapping (Keighery, BJ, and Trudgen 1992)

Uplands: *Eucalyptus calophylla* Open Forest to Woodland; *Banksia* species Low Woodland

Wetlands: *Eucalyptus calophylla* Open Forest to Woodland

Scattered Native Plants: not assessed

Vegetation Condition: >90% Very Good to Good, <25% Degraded

Total Flora: not known



Significant Flora: none recorded

Fauna: no known information

Linkage: adjacent bushland to the north and west (BS350); part of proposed Greenway 120 (Tingay, Alan & Associates 1997a), part of a regionally significant fragmented bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: 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 Peel-Harvey Estuary EPP/SPP; location of conservation category wetland; under TPS Landscape Zoning, Crown Reserve

Constraints: private land; under MRS Urban Zoning and Urban Deferred Zoning

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s).

MUNDIJONG AND WATKINS ROADS BUSHLAND, MUNDIJONG/PEEL ESTATE

Boundary Definition: protected area/bushland (part taken to cadastre)/management 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. 360 **Map no.** 89, 90, 91 **Map sheet series ref. no.** 2033-II NE, 2133-III NW

Other Names

Submission Area 281, Location 21 and 22 (Keighery, BJ, and Trudgen 1992), Watkins Rd Reserve

Area (ha): total 150.1; bushland 73.8 (some not mapped)

Local Authorities (Suburb)

Shire of Serpentine-Jarrahdale (Mundijong, Mardella, Oldbury)

Zoning

MRS: Rural, Urban, Urban Deferred, Parks and Recreation, Railways, Controlled Access Highways, Controlled Access Highway-Subject to Review, Other Major Highways

TPS: Farmlet, Landscape, Rural, Public Open Space, Local Roads, Public Purposes

Ownership Categories

Private, State Government, Commonwealth Government, Not identified

Lot/Location/Reserve numbers (Purpose),

Street name

42, 43, 101 Duckpond Rd; 1, 1724, 2145 Mundijong Rd; 61, 139, 199, 200, 408, 410 South Western Hwy; 410 Watkins Rd; 139 Galvin Rd; 46 Adams St; 217 Cockram St; 144, 1724, 55 street not identified

Crown Reserve

Reserve 23012 (Conservation of Flora)

CALM Managed Land

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Foothills

Colluvial Deposits (Qc: Csg)

Yoganup Formation (Qpr: S12)

Armada Shale (Pa: SH)

Pinjarra Plain

Guildford Formation (Qpa: CS, C2) (Qha: Msc1)

Bassendean Dunes/Pinjarra Plain

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

VEGETATION AND FLORA

Vegetation Complexes

Foothills

Forrestfield Complex (Ridge Hill Shelf, Darling Plateau)

Pinjarra Plain

Guildford Complex

Floristic Community Types *not sampled, types inferred

Supergroup 1: Foothills/Pinjarra Plain

3a *Eucalyptus calophylla* — *Kingia australis* woodlands on heavy soils (Mundijong Rd)

3c *Eucalyptus calophylla* — *Xanthorrhoea preissii* woodlands and shrublands (Mundijong Rd)

*S8 *Eucalyptus wandoo* woodlands (Scarp) (Watkins Rd)

Supergroup 2: Seasonal Wetlands

*2 Southern wet shrublands (Watkins Rd)

8 Herb-rich shrublands in clay pans (Mundijong Rd)

9 Dense shrublands on clay flats (Mundijong Rd)

*10a Shrublands on dry clay flats (Watkins Rd)

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau

*20b Eastern *Banksia attenuata* and/or *Eucalyptus marginata* woodlands (Watkins Rd)

WETLANDS

Wetland Types: palusplain, artificial channel, creek, sumpland

Natural Wetland Groups

Darling Plateau

Little Dardanup (D.2)

Pinjarra Plain

Keysbrook (P.1)

Wetland Management Objectives: Conservation (49.7ha), Multiple Use

Swan Coastal Plain Lakes EPP: 2.5ha

THREATENED ECOLOGICAL COMMUNITIES

Not assessed, Not determined, Critically Endangered (floristic community types 2, 3a, 3c, 10a, 20b), Vulnerable (floristic community types 8, 9)

SECTION 3: SPECIFIC SITE DETAIL (described in two parts)

Mundijong Road (from intersection Duckpond and Mundijong Roads, east to Watkins Road)

Landscape Features: vegetated wetland, vegetated uplands

Vegetation and Flora: limited survey (Gibson *et al.* 1994 (Duck 0-03, Mud 02-09), Keighery, BJ, and Trudgen 1992, Keighery, GJ, *et al.* 1995, Shire of Serpentine-Jarrahdale 1992); detailed survey (Keighery, BJ, 1996c, Keighery, BJ, *et al.* 1997a)

Structural Units: mapping (Keighery, BJ, 1996c, Keighery, BJ, *et al.* 1997a)

Uplands: *Eucalyptus calophylla* Forest to Woodland

Wetlands: *Eucalyptus calophylla* Forest to Woodland; *Casuarina obesa* Forest to Woodland; *Eucalyptus rudis* Woodland to Forest; *Melaleuca raphiophylla* Woodland to Forest; *Melaleuca* Open Heath to Shrubland dominated by *Melaleuca viminea*, *Melaleuca uncinata*, *M. lateriflora* and combinations of these; *Actinostrobos pyramidalis* Closed Tall Scrub to Shrubland; *Viminaria juncea* High Shrubland; *Melaleuca viminea* Tall Shrubland; *Pericalymma ellipticum* Heath; *Regelia ciliata* Heath; mixed Low Open Heath; Herblands dominated by *Borya* species, *Tribonanthes* species, *Stylidium* species and others in combination; Sedgeland dominated by *Leptocarpus canus*, *L. aristatus*, *L. coangustatus*, *Cyathochaeta avenacea*, *Chorizandra enodis* and combinations of these; *Themeda triandra* Grassland

Scattered Native Plants: scattered areas of Woodland to Forest dominated by *Eucalyptus calophylla*, *Casuarina obesa* and *Melaleuca raphiophylla* Low Forest to Woodland

Vegetation Condition: >50% Excellent to Very Good, <50% Good to Completely Degraded, with areas of severe localised disturbance (Keighery, BJ, 1996c, Keighery, BJ, *et al.* 1997)

Total Flora: 253 native taxa (Keighery, BJ, *et al.* 1997a) (estimated 90% expected flora)

Significant Flora: *Verticordia plumosa* var. *pleiobotrya* (R, only known from the Mundijong area), *Tetraria australiensis* (R), *Acacia lasiocarpa* var. *bracteolata* (1), *Eryngium pinnatifidum* subsp. *palustre* (2), *Myriophyllum echinatum* (3), *Stylidium mimeticum* (3), *Stylidium longitubum* (3), *Baekkea tenuifolia* (3), *Anthotium junciforme* (4), *Aponogeton hexatepalus* (4); *Angianthus drummondii* — *preissianus* — *micropodioides* Group, *Podolepis gracilis* (Swamp form), *Pogonolepis stricta* 'long bract form', *Drosera micrantha* subsp. *micrantha* (Swan Coastal Plain form), *Themeda triandra* (normally occurring in Wandoo

Woodland, here occurring in Marri Woodland), *Leptocarpus* aff. *crebriculmis* (BJK and NG 236), *Kennedia stirlingii* (most western record), *Trichocline spathulata*; including 74 taxa that are characteristic of the eastern side of the Swan Coastal Plain, at least 12 taxa that are endemic to the eastern side of the Plain

Fauna: no systematic survey. Significant mammal species: Quenda (Friend 1996 D)

Linkage: adjacent bushland to the north (BS350), south (BS365) and east; part of proposed Greenways 82, 1020, 129, 120 (Tingay, Alan & Associates 1997a); part of a regionally significant fragmented bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: identified since the early 1990s in a series of reports as being a regionally significant roadside remnant (Shire of Serpentine-Jarrahdale 1992; Keighery, BJ, and Trudgen 1992; Keighery, GJ, and Keighery 1992; Keighery, GJ, *et al.* 1995; Keighery, BJ, 1996c; Keighery, BJ, *et al.* 1997b); part Bushplan Site Threatened or Poorly Reserved Plant Community (EPA 1994 GIS); contains plant communities representative of the eastern side of the Swan Coastal Plain

Watkins Road Nature Reserve and bushland to east and north (corner South West Highway and Watkins Road)

Landscape Features: vegetated wetland, vegetated upland

Vegetation and Flora: limited survey (Keighery, BJ, and Trudgen 1992)

Structural Units: mapping (Keighery, BJ, and Trudgen 1992)

Uplands: *Eucalyptus calophylla* Low Open Woodland; *Eucalyptus wandoo* Woodland; *Banksia menziesii*, *B. attenuata* and *B. grandis* Low Woodland; *Eucalyptus marginata* Low Woodland

Wetlands: scattered *Melaleuca preissiana* in *Viminaria juncea* and *Hakea trifurcata* Tall Shrubland to Tall Open Shrubland; *Pericalymma ellipticum* Closed Heath; *Melaleuca* Low Woodland; *Lepidosperma longitudinale* Sedgeland

Vegetation Condition: >50% Excellent to Good, <50% Good to Completely Degraded, with areas of severe localised disturbance

Total Flora: not known

Significant Flora: *Tetraria australiensis* (R)

Fauna: no systematic survey. Significant mammal species: Quenda (Friend 1996 D)

Linkage: fragmented bushland/canopy linkage to east (Darling Range Regional Park (DPUD 1993))

Other Special Attributes: contains plant communities representative of the eastern side of the Swan Coastal Plain

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Listed on the Register of the National Estate

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, Swan Coastal Plain Lakes EPP; location of Declared Rare Flora, conservation category wetlands; under MRS Parks and Recreation Reservation and TPS Landscape Zoning and Public Open Space Zoning, Crown Reserve

Constraints: private land; under MRS Urban Zoning and Urban Deferred Zoning, MRD regional road requirements, General Mineral Resource Area (clay and shale), Titanium mineralisation subject to Exploration licence E70/323 (Westralian Sands Ltd)

Recommendation: The existing purpose, care, control and management of Reserve 23012 is endorsed. The most appropriate mechanism for the protection of the remainder of this Bushplan Site be considered through the public comment period in consultation with the land owner(s).

TRANSIT ROAD BUSHLAND, JARRAHDALE

Boundary Definition: bushland (part taken to cadastre) boundary (Areas of bushland within the boundaries of the Bushplan Site are not accurately mapped.)

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 71

Map no. 97

Map sheet series ref. no. 2133-III NW

Other Names: not known

Area (ha): total 3.2; bushland 3.1

Local Authorities (Suburb)
Shire of Serpentine-Jarrahdale (Mardella)

Zoning
MRS: Rural
TPS: Rural
Lot/Location/Reserve numbers (Purpose),
Street name
99 South Western Hwy

Ownership Categories
Private

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Foothills

Colluvial Deposits (Qc: Csg)
Yoganup Formation (Qpr: S12)

VEGETATION AND FLORA

Vegetation Complexes

Foothills

Forrestfield Complex (Ridge Hill Shelf, Darling Plateau)

Floristic Community Types: *not sampled, types inferred

Supergroup 1: Foothills/Pinjarra Plain

*3b *Eucalyptus calophylla* — *E. marginata* woodlands on sandy clay soils

WETLANDS

No wetlands mapped

THREATENED ECOLOGICAL COMMUNITIES

Vulnerable (floristic community type 3b)

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated uplands

Vegetation and Flora: not known

Structural Units: limited survey (Mattiske Consulting Pty. Ltd. 1997)

Uplands: *Eucalyptus calophylla*, *Allocasuarina fraseriana*, *Banksia grandis* and *Eucalyptus marginata* Woodland

Vegetation Condition: Excellent (Mattiske Consulting Pty. Ltd. 1997)

Total Flora: not known

Significant Flora: non recorded

Fauna: no known information

Linkage: adjacent bushland to the east; BS71 part of a regionally significant contiguous bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: 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, Rarity

Opportunities and/or Constraints

Opportunities: Bushplan Site subject to Peel-Harvey Estuary EPP/SPP

Constraints: private land; under General Mineral Resource Area (shale)

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s).

DOGHILL ROAD BUSHLAND, BALDIVIS

Boundary Definition: management/bushland taken to cadastre boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 369 **Map no.** 94 **Map sheet series ref. no.** 2033-II NW

Other Names: not known **Area (ha):** total 59.1; bushland 58.8



Local Authorities (Suburb)
City of Rockingham (Baldivis)

Zoning

MRS: Rural
TPS: Rural, Local Roads

Ownership Categories
Private (including commercial organisation)

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

1, 2, 300, 301, 302 Saint Albans Rd; 8, 17, 20, 1101,
1104 Doghill Rd

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Bassendean Dunes
Bassendean Sands (Qpb: S8)
Bassendean Dunes/Pinjarra Plain
Bassendean Sands over Guildford Formation (Qpb/Qpa: S10)

VEGETATION AND FLORA

Vegetation Complexes

Pinjarra Plain

Dardanup Complex

Floristic Community Types: not sampled, types unable to be inferred

WETLANDS

No wetlands mapped

THREATENED ECOLOGICAL COMMUNITIES

Not determined

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated uplands

Vegetation and Flora: aerial photography interpretation (Connell 1995, DEP 1998)

Structural Units

Uplands: Scattered *Eucalyptus marginata* over *Banksia* species Low Woodland

Scattered Native Plants: not assessed

Vegetation Condition: Good (Connell 1995)

Total Flora: not known

Significant Flora: none recorded

Fauna: no known information

Linkage: adjacent bushland to the north, south, east and west

Other Special Attributes: mapped within the boundaries 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

Opportunities and/or Constraints

Opportunities: Bushplan Site/part Bushplan Site subject to Peel-Harvey Estuary EPP/SPP

Constraints: private land

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s).

FOLLY POOL, BALDIVIS

Boundary Definition: bushland taken to cadastre/zoning boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 418

Map no. 94

Map sheet series ref. no. 2033-II NW

Other Names: not known

Area (ha): total 9.39 (includes open water); bushland 7.69



Local Authorities (Suburb)
City of Rockingham (Baldivis)

Ownership Categories
State Government

Zoning
MRS: Rural, Controlled Access Highways
TPS: Public Purposes, Rural, Landscape
Lot/Location/Reserve numbers (Purpose),
Street name
1361 Baldivis Rd
Crown Reserve

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Pinjarra Plain
Guildford Formation (Qpa: Mc2, C2)

VEGETATION AND FLORA

Vegetation Complexes
Pinjarra Plain
Serpentine River Complex

Floristic Community Types: not sampled, types not inferred
Supergroup 2: Seasonal Wetlands

WETLANDS

Wetland Types: sumpland, palusplain, artificial channel, principal channel

Natural Wetland Groups

Pinjarra Plain
Keysbrook (P.1)

Wetland Management Objectives: Resource Enhancement, Multiple Use
Swan Coastal Plain Lakes EPP: 6.9ha

THREATENED ECOLOGICAL COMMUNITIES

Not determined

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: open water, vegetated wetland

Vegetation and Flora: limited survey (DEP 1998)

Structural Units

Wetlands: *Eucalyptus rudis* Woodland over *Melaleuca raphiophylla* Low Forest; *Baumea* sp. Sedgeland; *Sedgelandia* sp. Sedgeland

Vegetation Condition: Very Good to Degraded

Total Flora: not known

Significant Flora: none recorded

Fauna: no known information

Linkage: no adjacent bushland; part of proposed Greenway 137 (Tingay, Alan & Associates 1997a), part of a regionally significant potential bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: mapped within the boundaries of the eastern side of the Swan Coastal Plain

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed, Indicative Place on Register of the National Estate

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, 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 Coastal Plain Lakes EPP, Peel-Harvey Estuary EPP/SPP; under TPS Landscape Zoning, Crown Reserve

Constraints: under MRD regional road requirements, General Mineral Resource Area (clay)

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.



MARAMANUP POOL, BALDIVIS

Boundary Definition: bushland taken to cadastre/zoning boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 419	Map no. 94	Map sheet series ref. no. 2033-II NW
Other Names: not known	Area (ha): total 17.5 (includes open water); bushland 13.8	
Local Authorities (Suburb) City of Rockingham (Baldivis)	Zoning MRS: Rural TPS: Public Purposes	
Ownership Categories State Government	Lot/Location/Reserve numbers (Purpose), Street name 1360 Young Rd Crown Reserve	

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Pinjarra Plain

Guildford Formation (Qpa: Mc2)

VEGETATION AND FLORA

Vegetation Complexes

Pinjarra Plain

Serpentine River Complex

Floristic Community Types: not sampled, types not inferred

Supergroup 2: Seasonal Wetlands

WETLANDS

Wetland Types: sumpland, palusplain, creek

Natural Wetland Groups

Pinjarra Plain

Keysbrook (P.1)

Wetland Management Objectives: Resource Enhancement, Multiple Use

Swan Coastal Plain Lakes EPP: 5.6ha

THREATENED ECOLOGICAL COMMUNITIES

Not determined

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: open water, vegetated wetland

Vegetation and Flora not surveyed from aerial photography interpretation, expected to be similar to BS418

Vegetation Condition: Good (Connell 1995)

Total Flora: not known

Significant Flora: none recorded

Fauna: no systematic survey. Significant mammal species: Quenda (Friend 1996 D)

Linkage: no adjacent bushland; part of proposed Greenway 137 (Tingay, Alan & Associates 1997a); part of a regionally significant potential bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: mapped within the boundaries of the eastern side of the Swan Coastal Plain

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed, Indicative Place of the Register of the National Estate

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Rarity, 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 Coastal Plain Lakes EPP, Peel-Harvey Estuary EPP/SPP, Crown Reserve

Constraints: under General Mineral Resource Area (clay)

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s).

RAPIDS ROAD BUSHLAND, PEEL ESTATE

Boundary Definition: bushland (part taken to cadastre) 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. 74 **Map no.** 95, 96 **Map sheet series ref. no.** 2033-II NE

Other Names **Area (ha):** total 33.183; bushland 33.183

Part Location 32 (Keighery and Trudgen 1992)

Local Authorities (Suburb)

Shire of Serpentine-Jarrahdale (Serpentine)

Zoning

MRS: Rural

TPS: Rural, Drainage Purposes

Lot/Location/Reserve numbers (Purpose),

Street name

834 Rapids Rd

Ownership Categories

Private

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

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 1: Foothills/Pinjarra Plain

3a *Eucalyptus calophylla* — *Kingia australis* woodlands on heavy soils

Supergroup 2: Seasonal Wetlands

7 Herb-rich saline shrublands in clay pans

10a Shrublands on dry clay flats

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau

(not sampled, types not inferred)

WETLANDS

Wetland Types: dampland, artificial channel

Natural Wetland Groups

Bassendean—Pinjarra transition OR Bassendean with fluvial features

Bennett Brook (B/P.4)

Wetland Management Objectives: Conservation (2.1ha), Resource Enhancement

Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Critically Endangered (floristic community type 3a), Endangered (floristic community type 10a), Vulnerable (floristic community type 7)

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated upland, vegetated wetland

Vegetation and Flora: limited survey (DEP 1996 (surveyed from roadside, Punr 01-03, in roadside verge), Keighery, BJ, and Trudgen 1992)

Structural Units: mapping (Keighery, BJ, and Trudgen 1992)

Uplands: *Eucalyptus calophylla* Woodland; *Banksia* Woodland

Wetlands: *Eucalyptus calophylla* Woodland; *Melaleuca viminea* and *Viminaria juncea* Tall Open Scrub; Open Low Heath dominated by *Regelia ciliata*, *Hakea sulcata*, *Pericalymma ellipticum*, *Astartea* aff. *fascicularis*,



Kunzea micrantha, *Verticordia densiflora* and combinations of these sometimes with scattered clumps of *Actinostrobilus pyramidalis*; Herblands dominated by *Stylidium* species and Asteraceous species; Sedgeland dominated by *Lepyrodia macra*, *Leptocarpus canus*, *L. aristatus* and *Lepidosperma longitundinale*

Scattered Native Plants: not assessed

Vegetation Condition: <60% Very Good to Excellent, >40% Good to Degraded, with areas of severe localised disturbance

Total Flora: 100 native taxa (plot-generated list only)

Significant Flora: *Acacia lasiocarpa* var. *bracteolata* (1), *Eryngium pinnatifidum* subsp. *palustre* ms (2), *Stylidium mimeticum* (3), *Verticordia lindleyi* subsp. *lindleyi* (4); *Stylidium roseo-alatum*, *Pimelea imbricata* var. *major*, *Myriocephalus helichrysoides*, *Conospermum huegelii*

Fauna: no systematic survey. Significant mammal species: Quenda (Friend 1996 D)

Linkage: adjacent bushland/canopy to the west

Other Special Attributes: recommended to be managed for flora conservation (Keighery, BJ, and Trudgen 1992); Threatened or Poorly Reserved Plant Community (EPA 1994 GIS); 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 Peel-Harvey Estuary EPP/SPP; location of conservation category wetland

Constraints: private land

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s).

RIVER, STAKEHILL AND HARVEY ROADS BUSHLAND, KARNUP

Boundary Definition bushland (part taken to cadastre)/conservation wetland 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. 277 **Map no.** 100 **Map sheet series ref. no.** 2033-II SW

Other Names: not known

Area (ha): total 36.7 (includes open water); bushland 27.4

Local Authorities (Suburb)
City of Rockingham (Karnup)

Zoning
MRS: Rural, Parks and Recreation, Controlled Access Highways, Public Purposes-Special Uses

TPS: Landscape, Public Purposes, Rural

Ownership Categories
State Government

Lot/Location/Reserve numbers (Purpose),

Street name
1319, 1334 Stakehill Rd

CALM Managed Land

Crown Reserve
Reserve 37090 (Explosives and Forestry Purposes)

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Pinjarra Plain

Guildford Formation (Qpa: C2)

Bassendean Dunes

Bassendean Sands (Qpb: S8)

VEGETATION AND FLORA

Vegetation Complexes



Pinjarra Plain

Serpentine River Complex

Floristic Community Types: not sampled, types not inferred

Supergroup 2: Seasonal Wetlands

WETLANDS

Wetland Types: sumpland, floodplain

Natural Wetland Groups

Swan Coastal Plain Rivers

Goegrup (R.4)

Wetland Management Objectives: Conservation (25.4ha), Resource Enhancement

Swan Coastal Plain Lakes EPP: 0.4ha and 7.5ha (total 7.9ha)

THREATENED ECOLOGICAL COMMUNITIES

Not determined

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: open water, vegetated wetland

Vegetation and Flora: limited survey (Connell 1995)

Structural Units: not known

Vegetation Condition: Very Good (Connell 1995)

Total Flora: not known

Significant Flora: none recorded

Fauna: no known information

Linkage: no adjacent bushland; part of a regionally significant fragmented bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: mapped within the boundaries 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, 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 Peel-Harvey Estuary EPP/SPP, Swan Coastal Plain Lakes EPP; location of conservation category wetlands; under MRS Parks and Recreation Reservation and TPS Landscape Zoning, Crown Reserve

Constraints: under MRD regional road requirements, General Mineral Resource Area (clay)

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s).

SERPENTINE NATIONAL PARK AND ADJACENT BUSHLAND, SERPENTINE

Boundary Definition: protected area/bushland (part taken to cadastre)/vegetation complex boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 468 **Map no.** 96, 102 **Map sheet series ref. no.** 2033-II NE, 2033-II SE

Other Names: not known **Area (ha):** total 4.9; bushland 4.9

Local Authorities (Suburb) **Zoning**

Shire of Serpentine-Jarrahdale (Serpentine) **MRS:** Rural, Parks and Recreation

TPS: Landscape, Rural

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

State Government **Street name**

2118 Hart Rd

Crown Reserve

CALM Managed Land

Reserve 28862 (National Park)



SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Foothills

Colluvial Deposits (Qc: Csg)

Pinjarra Plain

Alluvial/Colluvial Deposit (Qa: FS1)

VEGETATION AND FLORA

Vegetation Complexes

Foothills

Forrestfield Complex (Ridge Hill Shelf, Darling Plateau)

Floristic Community Types:

Supergroup 1: Foothills/Pinjarra Plain

3b *Eucalyptus calophylla* — *E. marginata* woodlands on sandy clay soils

WETLANDS

Wetland Types: creek

Natural Wetland Groups

Darling Plateau

Little Dardanup (D.2)

Pinjarra Plain

Keysbrook (P.1)

Swan Coastal Plain Rivers

Goegrup (R.4)

Wetland Management Objectives: not assessed

Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Vulnerable (floristic community type 3b)

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: creek, vegetated uplands

Vegetation and Flora: limited survey (DEP 1996 (Serp 01-04))

Structural Units

Uplands : Woodlands dominated by *Eucalyptus calophylla* or *E. marginata* subsp. *elegantella* sometimes over *Eucalyptus lanepolei* Low Woodland over species-rich Mixed Open Low Heaths.

Wetlands: *Eucalyptus calophylla* Woodland

Vegetation Condition: Excellent

Total Flora: not known

Significant Flora: *Eucalyptus marginata* subsp. *elegantella* (2), *Lambertia multiflora* var *darlingensis* (3); *Xanthorrhoea acanthostachya*, *Isopogon asper*, *Eucalyptus lanepolei*, *Nemcia dilatata*

Fauna: no known information

Linkage: adjacent bushland to the east; part of a regionally significant contiguous bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: contains plant communities representative of the eastern side of the Swan Coastal Plain

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Part Bushplan Site Listed on the Register of the National Estate

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Diversity, Rarity, Maintaining ecological processes or natural systems, 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 under MRS Parks and Recreation Reservation and TPS Landscape Zoning, Crown Reserve

Constraints: under General Mineral Resource Area (shale)

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s).

KINGSBURY DRIVE BUSHLAND, KEYSBROOK

Boundary Definition: bushland/vegetation complex boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 76 **Map no.** 102 **Map sheet series ref. no.** 2033-II SE

Other Names: not known

Area (ha): total 40.6; bushland 40.6

Local Authorities (Suburb)

Zoning

Shire of Serpentine-Jarrahdale (Keysbrook)

MRS: Rural

TPS: Rural

Ownership Categories

Lot/Location/Reserve numbers (Purpose),

Private

Street name

2, 10, 12 South Western Highway; 11 Kingsbury Dr

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Darling Plateau (Darling Range)/Darling Scarp

Even-grained Granite (Ae, Aes: GR)

Foothills

Colluvial Deposits (Qc: Scg)

VEGETATION AND FLORA

Vegetation Complexes

Foothills

Forrestfield Complex (Ridge Hill Shelf, Darling Plateau)

Pinjarra Plain

Guildford Complex

Floristic Community Types: not sampled, types not inferred.

WETLANDS

No wetlands mapped

THREATENED ECOLOGICAL COMMUNITIES

Not determined

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated uplands, NS ridge with extensive views across the Swan Coastal Plain

Vegetation and Flora: limited survey (Connell 1995, DEP 1998, surveyed from roadside)

Structural Units:

Uplands: *Eucalyptus calophylla* Woodlands with scattered clumps of *E. wandoo* and occasional *E. lanepolei*

Scattered Native Plants: not assessed

Vegetation Condition: Excellent (Connell 1995)

Total Flora: not known

Significant Flora: *Eucalyptus lanepolei* and most northern record of *E. haematoxylon* in adjacent bushland to north and north east

Fauna: no known information

Linkage: adjacent bushland to the east forming linkage to Darling Range Regional Park (DPUD 1993); part of a regionally significant contiguous bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: Contains plant communities representative of the eastern side of the Swan Coastal Plain or Scarp; One of a few areas in the PMR where the Plain and the Plateau meet through naturally vegetated areas

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities

Opportunities and/or Constraints

Constraints: Bushplan Site private land

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s).

MYARA BROOK BUSHLAND, KEYSBROOK

Boundary Definition: bushland taken to zoning boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 426 **Map no.** 102, 106 **Map sheet series ref. no.** 2033-II SE

Other Names: not known

Area (ha): total 10.3; bushland 8.7

Local Authorities (Suburb)

Zoning

Shire of Serpentine-Jarrahdale (Keysbrook)

MRS: Rural

TPS: Public Open Space, Rural, Landscape

Ownership Categories

Lot/Location/Reserve numbers (Purpose),

State Government

Street name

72, 73 Elliott Rd

Crown Reserve

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Foothills

Colluvial Deposits (Qc: Csg)

Pinjarra Plain

Guildford Formation (Qpa: Cs)

VEGETATION AND FLORA

Vegetation Complexes

Pinjarra Plain

Guildford Complex

Floristic Community Types: not sampled, types not inferred

Supergroup 2: Seasonal Wetlands

WETLANDS

Wetland Types: palusplain, creek

Natural Wetland Groups

Pinjarra Plain

Keysbrook (P.1)

Wetland Management Objectives: Conservation (6.3ha, 1008.6m), Multiple Use

Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Not determined

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated wetland, creek

Vegetation and Flora: limited survey (Connell 1995, DEP 1998)

Structural Units

Wetlands: *Eucalyptus rudis* Woodland to Forest

Vegetation Condition: Good (Connell 1995)

Total Flora: not known

Significant Flora: none recorded

Fauna: no known information

Linkage: no adjacent bushland; part of proposed Greenway 140 (Tingay, Alan & Associates 1997a)

Other Special Attributes: 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, 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 Peel-Harvey Estuary EPP/SPP; location of conservation category wetlands; under TPS Public Open Space Zoning and Landscape Zoning, Crown Reserve
 Constraints: under General Mineral Resource Area (clay)

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s).

PAGE ROAD BUSHLAND, KEYSBROOK

Boundary Definition: bushland boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 78 **Map no. 106** **Map sheet series ref. no. 2033-II SE**

Other Names: not known **Area (ha):** total 1.2; bushland 1.2

Local Authorities (Suburb) **Zoning**

Shire of Serpentine-Jarrahdale (Keysbrook) **MRS: Rural**

TPS: Rural

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

Private **Street name**

1 South Western Hwy

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Foothills

Colluvial Deposits (Qc: Csg)

VEGETATION AND FLORA

Vegetation Complexes

Foothills

Forrestfield Complex (Ridge Hill Shelf, Darling Plateau)

Floristic Community Types

Supergroup 1: Foothills/Pinjarra Plain

3b *Eucalyptus calophylla* — *E. marginata* woodlands on sandy clay soils

WETLANDS

Mapped wetland but no wetland areas evident on survey (DEP 1996)

Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Vulnerable (floristic community type 3b)

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated uplands, vegetated wetlands

Vegetation and Flora: limited survey (DEP 1996 (Page 01))

Structural Units

Uplands: *Eucalyptus marginata* subsp. *elegantella* Open Woodland over species-rich Mixed Open Low Heath

Wetlands: no known information

Vegetation Condition: >90% Excellent

Total Flora: 58 native taxa (plot-generated list only)

Significant Flora: *Tetraria australiensis* (R); *Eucalyptus marginata* subsp. *elegantella* (2), *Calothamnus graniticus* subsp. *leptophyllus* (4); *Nemcia dilatata*, *Patersonia babianoides*, *Xanthorrhoea acanthostachya*

Fauna: no known information

Linkage: no adjacent bushland

Other Special Attributes: recommended to be managed for flora conservation (Keighery, BJ, and Trudgen 1992); Threatened or Poorly Reserved Plant Community (EPA 1994 GIS); 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

Opportunities and/or Constraints

Opportunities: Bushplan Site subject to Peel-Harvey Estuary EPP/SPP; location of Declared Rare Flora, conservation category wetlands

Constraints: private land

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s). This may include — The conservation values of the Bushplan Site to be protected through one or more of a range of complementary mechanisms to encourage and secure conservation management on private lands, the specific approach to be determined in consultation/negotiation with the land owner(s), but generally to include conservation covenants/management agreements.

2.3 BASSENDEAN DUNES

Part B

2.3 BASSENDEAN DUNES

2.3.1 INTRODUCTION

Location, Landscape and Soils

The Bassendean Dunes lie in the centre of the Swan Coastal Plain and are the oldest of the three aeolian dune systems. The dunes of the Bassendean system are generally of low relief, often with broad swales or relatively flat sand sheets between the low dunes. The tallest dunes, of up to 80 metres, occur in the north of the Perth Metropolitan Region, in the area east of Lake Pinjar.

Soils are predominantly deep grey leached quartz sands (Table 1.3a&b). To the west the Bassendean Dunes overlay the Pinjarra Plain and wetlands which interleave the dunes or sand sheets have a clay base (Table 2.3). Towards the west the wetlands are generally associated with peaty sands formed between the dunes (Table 2.3). As a consequence a diversity of wetlands occurs within the Bassendean Dunes (five natural groups, Table 2.3). In addition distinctive wetlands occur where the Bassendean Dunes and Pinjarra Plain interface (two natural groups) and where the Spearwood and Bassendean Dunes interface.

Remnant Bushland on the Bassendean Dunes

Until recently the Bassendean Dunes were characterised by low levels of clearing, the infertile sands being unsuitable for agriculture or forestry. The predominant land use was low-level grazing, the interleaving wetlands being the focus for more intensive grazing or horticulture. In recent times, with the expansion of urban areas, these dunes have proved suitable for housing lands.

Recent mapping of native vegetation in the Perth Metropolitan Region indicates that between 13 per cent and 100 per cent of the vegetation complexes associated with the Bassendean Dunes only remain as native vegetation (Table 3.3). The Herdsman, which traverses two major landform elements — the Bassendean and Spearwood Dunes — has 31 per cent remaining. The Pinjar Complex, which is confined to the Perth Metropolitan Region, has 25 per cent of its area remaining as native vegetation.

Plant Communities and their Conservation on the Bassendean Dunes

At the regional level four vegetation complexes (Table 3.3) are confined to the Bassendean Dunes and three others are associated with the Bassendean Dunes. Two of these complexes are confined to the Perth Metropolitan Region — the Pinjar and Bassendean Central and South transition. Nineteen floristic community types (Table 4.3, including 13 wetland groups and six upland groups) are the principal regional floristic groups identified on the Bassendean Dunes in the Perth Metropolitan Region. The most species-rich of the woodlands — floristic community type 23a — is virtually confined to the Perth Metropolitan Region.

Ten plant and faunal communities associated with the area of the Bassendean Dunes are identified as threatened ecological communities (Table 5.3). The nine threatened plant communities are not common within the Bassendean Dunes, generally being associated with the Pinjarra Plain and Foothills. They are found on the clay-based wetlands of the Pinjar Complex and on the Muchea Limestones, clay-based wetlands and sands of the interface of the Bassendean Dunes and Pinjarra Plain, principally within the Southern River Complex. The tenth group is a faunal wetland community associated with tumulus springs.

A diverse suite of vegetation associations has been identified on the Bassendean Dunes. The main associations are listed below.

Uplands

The main upland associations are low forests to low woodlands associated with a very diverse understorey (Table 4.3). These broad units and associated dominant species are:

Forests and Woodlands

Eucalypts — *Eucalyptus marginata*, *E. tottiana*, *E. calophylla*

Sheoaks — *Allocasuarina fraseriana*

Banksias — *Banksia attenuata*, *B. menziesii*, *B. ilicifolia*, *B. grandis*

Others — *Nuytsia floribunda*, *Acacia saligna*

Shrublands

Adenanthos cygnorum, *Bossiaea eriocarpa*, *Hovea*





trisperma, *Leucopogon conostephioides*, *Daviesia physodes*, *Dryandra lindleyana* subsp. *lindleyana*, *Petrophile linearis*, *Stirlingia linearis*, *Scholtzia involucrata*, *Calytrix flavescens*, *Conostephium pendulum*, *Gompholobium tomentosum*, *Hibbertia hypericoides*, *H. huegelii*, *Xanthorrhoea preissii*, *Acacia pulchella*

Herblands

Phlebocarya ciliata, *Lomandra* species, *Conostylis aculeata*, *C. juncea*, *Patersonia occidentalis*, *Dampiera linearis*, *Burchardia congesta*, *Drosera* species, *Stylidium bulbiferum*, *S. repens*, *S. piliferum*

Sedgelands

Schoenus curvifolius, *Lyginia barbata*, *Lepidosperma angustatum*, *Loxocarya flexuosa*

Grasslands

Austrodanthonia occidentalis, *Amphipogon turbinatus*

Wetlands

These broad units and associated dominant species are:

Open Forests and Woodlands

Eucalypts — *Eucalyptus rudis*, *E. calophylla*
Banksias — *Banksia ilicifolia*, *B. littoralis*
Melaleucas — *Melaleuca preissiana*,
M. raphiophylla
Others — *Acacia saligna*

Shrublands

Kunzea ericifolia, *Regelia ciliata*, *Hypocalymma angustifolium*, *Hakea varia*, *Pericalymma ellipticum*,

Melaleuca teretifolia, *Xanthorrhoea preissii*, *Acacia pulchella*

Herblands

Phlebocarya ciliata, *Conostylis juncea*, *Patersonia occidentalis*, *Drosera* species, *Stylidium repens*, *S. bulbiferum*, *Villarsia* species

Sedgelands

Baumea vaginalis, *B. articulata*, *B. juncea*, *Lyginia barbata*, *Hypolaena exsulca*, *Evandra pauciflora*, *Lepidosperma longitudinale*, *Loxocarya pubescens*, *Restio stenostachyus*, *Juncus pallidus*

Grasslands

Amphipogon debilis

The woodland communities of the Bassendean Dunes have high levels of species diversity (Table 3.3). Forty-three significant taxa are associated with the Dunes in the Perth Metropolitan Region (Table 6.3). These include five Declared Rare Flora and 13 Priority Flora taxa. A few species such as *Lysinema elegans* are endemic to the Bassendean Dunes but extend beyond the Perth Metropolitan Region.

The area of Bassendean Dunes vegetation remaining on the Swan Coastal Plain is comparatively large when compared with the area remaining vegetated of the other major landform elements. With appropriate planning and protection the plant communities and flora of the Bassendean Dunes will be able to be protected in areas of sufficient size and diversity to allow for the continuation of natural processes.



Part B

Table 1.3a: Geological and geomorphological systems of the Bassendean Dunes. The general terms used in Perth's Bushplan for describing the major landform elements are in **bold italics**.

Major Geological Systems (after Playford et al., 1976)	Major Geomorphological Systems (after McArthur and Bettenay, 1960)	Detailed Geomorphological Units (after Churchward and McArthur, 1980)
Bassendean Sand	Bassendean Dunes	Bassendean
Bassendean Sand / Guildford Formation	Not applicable	Southern River#
Wetlands (within the Guildford Formation, Bassendean Sand, Tamala Limestone)	Not applicable	Herdsmen

Combined here under Bassendean Dunes for major landform elements, see Volume 2, Part A Tables 1 and 2.

Table 1.3b: Landform and soils of the Bassendean Dunes showing the relationship between geomorphological units, units identified in the Environmental Geology Maps and soils described on these maps on the Swan Coastal Plain in the Perth Metropolitan Region. Column One can be used to cross-reference to groups shown in Table 1a.

Major Geomorphological Systems (after McArthur and Bettenay, 1960); *Detailed Geomorphological Units (after Churchward and McArthur, 1980)	Major Units in the Environmental Geology Maps (after various authors)	Soils associated with each unit
Bassendean Dunes *Bassendean, #Southern River	Bassendean Sands and Bassendean Sands over Guildford Formation	light grey quartz sands and light grey quartz sands over silty sands
Wetlands – within the Pinjarra Plain, Bassendean Dunes, Spearwood Dunes, Quindalup Dunes (Herdsmen)	Holocene swamp deposits	peats associated with clays, sands and silts in various proportions

Combined here under Bassendean Dunes for major landform elements, see Volume 2A Tables 1 and 2.



Table 2.3: Natural Wetland Groups (Consanguineous Suites) on the Bassendean Dunes (after Semeniuk, 1996)

Name & locations	Geomorphic setting	Primary wetlands	Stratigraphy	Origin of wetlands
Bassendean Dunes				
Lake Pinjar suite (B1) Lake Pinjar area	Bassendean Dunes with higher undulating dunes on the western margin of the wetland	Sumpland	Quartz sand sheet overlying clay sheet on Bassendean Sand	Coalesced Bassendean Dune wetlands; meteoric water & discharge water from Ghangara Mound ponded by clay bed
Ghangara suite (B2) East of Wanneroo includes Lake Ghangara & Lake Jandabup	Bassendean Dunes with slightly higher undulating dunes on western margin of this area. Wetlands enclosed by saddles or ridges	Lakes & sumplands & occasional damplands	Diatom mud, peaty sand, & clay overlying quartz sand. Hardpans (ferricreted quartz sand) at level of water table	Groundwater wetlands. Large lakes appear as coalesced smaller basins. Drainage is impeded by thin clay diatom mud or ferricrete layers superimposed on, or within the quartzose Bassendean sand
Jandakot suite (B3) 1. Nine Mile Swamp area 2. Spade Lake to Caladenia Lake area 3. Bindjar area 4. Ghangara Pine Forest area 5. Jandakot area 6. West Benger area	Bassendean Dunes comprised of low dunes & depressions	Damplands & sumplands	Peat or peaty sand or humic sand overlying quartz sand	Groundwater surfacing or near surface in depressions to develop water table basins
Riverdale suite (B4) 1. West of Gingin, north & south of Gingin Brook 2. East Pinjar Lake area	Bassendean Dunes comprised of low, regularly undulating dunes	Sumplands	Clay, peat or peaty sand overlying quartz sand	Wetlands occur in regularly spaced depressions as parallel microscale interdunal swales to form linear parallel chains; recharge by precipitation & groundwater rise, often maintained by ponding on a clay or peat bed
Bennett Brook suite (B/P4) 1. Ballajura: In Bennett Brook area west of West Swan 2. Balannup: In Southern River area north of Forrestdale Lake 3. Yangedi: In Serpentine River area west of Serpentine township	Bassendean Dunes with microscale creeks	Sumplands creeks palusplains floodplains	Quartz sands, or clay overlying quartz sand	Depressions which intersect the water table. Precipitation is ponded by clay lenses in the sub-surface. Palusplains are situated between tributaries



Part B

Table 2.3: (continued)

Name & locations	Geomorphic setting	Primary wetlands	Stratigraphy	Origin of wetlands
Pinjarra Plain – Bassendean Dunes transition OR Bassendean with fluvial features				
Mungala suite (B/P2) Perth Airport surrounds including Wright Lake	Transition between Bassendean Dunes & Pinjarra Plain. Underlying stratigraphy is a complex of sands, clays, calcrete & laterite. Wetlands lie along depressions at the distributary ends of the creeks or adjacent to intermittent disconnected drainage channels.	Lakes & sumplands, floodplains, & creeks	Variable: clays to clay overlying quartz sand to quartz sand overlying laterite or calcrete	Alluvial fan distributaries of creeks terminate in wetlands already present in Bassendean sandplain, bringing water & sediment.
Muchea suite (B/P3) 1. Western margin of Whitfield Brook e.g. Six Mile Swamp 2. Western margin of Ellen Brook	Complex transition between Bassendean Dunes & Pinjarra Plain. Wetlands lie along the depressions at the base Bassendean Dunes & at the headwaters of the tributaries of creeks.	Sumplands Floodplains	Complex & variable pattern of quartz sand, clays, laterite & calcrete	Discharge of groundwater into basins, flats & creeks. Ponding of rainwater & groundwater occurs over impermeable sediments.
Bassendean – Spearwood Dunes Interface				
Bibra suite (SB1) 1. Linear belt extending south from Bidaminna to Caladenia Cave 2. Linear belt extending from Murdoch to Wellard in a N/S orientation approximately 5-7km east of the coast	Spearwood Dunes & Bassendean Dunes contact depression. Continuous high dune ridges to the west & a series of discontinuous hollows & hills with lower relief to the east.	Lakes & sumplands in a north-south oriented chain	Mud, peat, or peaty sand overlying Bassendean Sand	Contact depressions with groundwater impounded against Spearwood Dune ridge

Table 3.3: Vegetation complexes (Hedde et al., 1980) and percentage remaining as native vegetation (AgWA, 1998 GIS) on the Bassendean Dunes in the Perth Metropolitan Region

Vegetation Complex	Native Vegetation (%)
Bassendean Dunes	
BASSENDEAN COMPLEX – NORTH:Vegetation ranges from a low open forest and low open woodland of <i>Banksia</i> species – <i>Eucalyptus tottiana</i> to low woodland of <i>Melaleuca</i> species and sedgelands which occupy the moister sites.	54
BASSENDEAN COMPLEX – CENTRAL AND SOUTH:Vegetation ranges from woodland of <i>Eucalyptus marginata</i> – <i>Allocasuarina fraseriana</i> – <i>Banksia</i> species to low woodland of <i>Melaleuca</i> species, and sedgelands on the moister sites.This area includes the transition of <i>E. marginata</i> to <i>E. tottiana</i> in the vicinity of Perth.	24
BASSENDEAN COMPLEX – NORTH – TRANSITION VEGETATION COMPLEX: A transition complex of low open forest and low woodland of <i>Banksia</i> species – <i>Eucalyptus tottiana</i> on a series of high sand dunes.The understorey species reflect similarities with both the Bassendean-North and Karrakatta-North vegetation complexes.	72
BASSENDEAN COMPLEX – CENTRAL AND SOUTH – TRANSITION VEGETATION COMPLEX: Woodland of <i>Eucalyptus marginata</i> – <i>E. calophylla</i> with well defined second storey of <i>Allocasuarina fraseriana</i> and <i>Banksia grandis</i> on the deeper soils and a closed scrub on the moister sites.The understorey species reflect similarities with the adjacent vegetation complexes.	100
Combinations of Bassendean Dunes/Pinjarra Plain/Spearwood Dunes	
SOUTHERN RIVER COMPLEX: Open woodland of <i>Eucalyptus calophylla</i> – <i>E. marginata</i> – <i>Banksia</i> species with fringing woodland of <i>E. rudis</i> – <i>Melaleuca raphiophylla</i> along creek beds.	17
Wetlands	
*HERDSMAN COMPLEX: Sedgelands and fringing woodland of <i>Eucalyptus rudis</i> – <i>Melaleuca</i> species	31
PINJAR COMPLEX:Vegetation ranges from woodland of <i>Eucalyptus marginata</i> – <i>Banksia</i> species to a fringing woodland of <i>E. rudis</i> – <i>Melaleuca preissiana</i> and sedgelands.	25
* Also included in 2.4 SPEARWOOD DUNES	

Table 4.3: Floristic community types identified on the Bassendean Dunes (after Gibson et al., 1994, and DEP, 1996)

Key

Column 1: Floristic Community Type Codes

The numbers of the types additional to Gibson et al. (1994) are italicised if they are subsets of an existing group (in types 19, 20, 23 and 30) and italicised and preceded by 'S' if they are supplementary groups.

Column 2: General Description of Floristic Community Types

Descriptions are based on generalised information from all plots in the group. Structural units are categorised into forest, woodlands, shrublands, sedgelands and herblands after Gibson et al. (1994).

Column 3: Average Species Richness per Floristic Community Type

Average species richness per 10x10m plot less those species only occurring in a single plot. Some community types can have a high proportion of single records.Thus these estimates of average species richness are underestimates in some cases.

Supergroup 2 – Seasonal Wetlands		
4	<i>Melaleuca preissiana</i> damplands	33.2
5	Mixed shrub damplands	38.4
11	Wet forests and woodlands	28.0

Part B



Table 4.3: (continued)

12	<i>Melaleuca teretifolia</i> and/or <i>Astartea</i> aff. <i>fascicularis</i> shrublands	27.3
13	Deeper wetlands on heavy soils	16.9
14	Deeper wetlands on sandy soils	16.5
S1	<i>Astartea</i> aff. <i>fascicularis</i> / <i>Melaleuca</i> species dense shrublands	22.4
S2	Northern <i>Pericalymma ellipticum</i> dense low shrublands	17.7
S3	Wet sedgelands on sandy clays	10.6
S5	<i>Acacia saligna</i> wetlands	23.3
S6	Northern dense low shrublands	35.4
S7	Northern woodlands to forests over tall sedgelands alongside permanent wetlands	17.7
S17	<i>Eucalyptus rudis</i> / <i>Agonis linearifolia</i> wetlands in Bassendean Dunes	15.2
Supergroup 3 – Uplands centred on Bassendean Dunes and Dandaragan Plateau		
21a	Central <i>Banksia attenuata</i> – <i>Eucalyptus marginata</i> woodlands	52.0
21c	Low lying <i>Banksia attenuata</i> woodlands or shrublands	38.5
22	<i>Banksia ilicifolia</i> woodlands	30.0
23a	Central <i>Banksia attenuata</i> – <i>Banksia menziesii</i> woodlands	59.0
23b	Northern <i>Banksia attenuata</i> – <i>B. menziesii</i> woodlands	47.0
S9	<i>Banksia attenuata</i> woodlands over dense low shrublands	38.9

Table 5.3: Threatened ecological communities (English and Blyth, 1997) on the Bassendean Dunes

Key

CR Critically Endangered EN Endangered VU Vulnerable

A. Floristic Community Types

Supergroup 2 – Seasonal Wetlands

7	Herb rich saline shrublands in clay pans	VU
8	Herb rich shrublands in clay pans	VU
10a	Shrublands on dry clay flats	EN
15	Forests and woodlands of deep seasonal wetlands	VU
18	Shrublands on calcareous silts	VU

Supergroup 3 – Uplands centred on Bassendean Dunes and Dandaragan Plateau

20a	<i>Banksia attenuata</i> woodlands over species rich dense shrublands	EN
20b	Eastern <i>Banksia attenuata</i> and/or <i>E. marginata</i> woodlands	EN

B: Restricted floristic community type mosaics

Muhea Limestones (Keighery, GJ, and Keighery 1995)	CR
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C: Freshwater communities

Communities of Tumulus Springs (Ahmat 1993, Jasinska and Knott 1994)	CR
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Table 6.3: Significant flora of the Bassendean Dunes in the Perth Metropolitan Region

Key

Column 1 Taxon

Names follow Gibson (1994) and Atkins (1998) unless indicated otherwise. Taxa yet to be named have an attached reference collection number from the relevant collector. An 'ms' after the name indicates that this is a manuscript name which is yet to be published.

Column 2 Major landform elements

- DS = Darling Scarp
- D = Dandaragan Plateau
- F = Foothills
- P = Pinjarra Plain
- B = Bassendean Dunes
- S = Spearwood Dunes
- Q = Quindalup Dunes
- R = Estuaries, Rivers and Creeks
- int = interface of two units
- (ML) = Muchea Limestones
- (TL) = Tamala Limestones

Column 3 Taxa dependent on seasonal waterlogging or inundation

- W = depends on waterlogging or inundation of area
- W (aquatic) = depends on standing water

Column 4 Conservation status (Atkins 1998)

- R = Declared Rare Flora
- 1 = Priority 1: Poorly Known Taxa
- 2 = Priority 2: Poorly Known Taxa
- 3 = Priority 3: Poorly Known Taxa
- 4 = Priority 4: Rare Taxa

Column 5 Regional ecological preferences

- e = taxa endemic to the Swan Coastal Plain
- E = taxa endemic to the Swan Coastal Plain in the Perth Metropolitan Region

Geographical Variation

- r = populations at the northern or southern limit of their known geographic range
- d = populations disjunct from their known geographic range
- p = considered to be poorly reserved (applies to all Declared Rare Flora and Priority taxa)
- s = significant populations (applies to all Declared Rare Flora and Priority taxa)
- X = considered lost in the Perth Metropolitan Region

Taxon	Major landform element	Wetland taxa	DRF/ Priority code	Significance code
<i>Acacia benthamii</i>	S/B		2	p, s, E
<i>Aotus cordifolia</i>	B/P	W	3	p, s
<i>Blancoa canescens</i>	int: B/F			d, p
<i>Boronia crenulata</i> var. <i>gracilis</i>	B			e
<i>Boronia capitata</i> subsp. <i>gracilis</i>	B		2	p, s
<i>Boronia purdieana</i>	S/B			r
<i>Burchardia bairdii</i>	int: P/B	W		r
<i>Byblis gigantea</i>	int: B/P	W		d, p, r
<i>Caladenia huegelii</i>	B		R	p, s
<i>Comesperma rhadinocarpum</i>	P/B	W	2	p, s, d
<i>Conospermum triplinervium</i>	S/B/P			s, p
<i>Conostephium minus</i>	B		4	p, s
<i>Conostylis aculeata</i> subsp. <i>cygnorum</i>	S/B			e

Part B

Table 6.3 (continued)

<i>Cyathochaeta teretifolia</i>	B/P	W	3	p, s
<i>Dillwynia dillwynioides</i>	B, int B/P	W	3	p, s, e
<i>Diuris purdiei</i>	int B/P	W	R	p, s, e
<i>Drakaea elastica</i>	B		R	p, s, e
<i>Drakaea micrantha</i>	B		R	p, s
<i>Drosera gigantea</i> subsp. <i>geniculata</i>	B/P	W		s, e
<i>Epiblema grandiflorum</i> var. <i>cyanea</i> ms	B	W	R	p, s
<i>Eremaea fimbriata</i>	B			r
<i>Eremaea purpurea</i>	B			d, p
<i>Evandra pauciflora</i>	B			r
<i>Glischrocaryon aureum</i>	S/B/F			p
<i>Haloragis cordiger</i>	B/P			s
<i>Hensmania turbinata</i>	B			r
<i>Jacksonia gracilis</i> ms (previously aff. <i>sericea</i> or swamp form)	B/P			e
<i>Kunzea littoricola</i> ms	P/B	W		e
<i>Leucopogon kingianus</i>	B			s
<i>Lysinema elegans</i>	B			e
<i>Macarthuria apetala</i>	B			s
<i>Olax scalariformis</i>	F/B		3	p, s, d
<i>Platysace juncea</i>	B/F			p
<i>Pterostylis frenchii</i> ms	S/B			e, r, s, p
<i>Restio stenostachyus</i>	B/P	W		e
<i>Stachystemon axillaris</i>	F/P/B		4	p, s
<i>Stylidium crossocephalum</i>	B			r
<i>Stylidium mimeticum</i>	P/B	W	3	p, s
<i>Thysanotus glaucus</i>	B		4	p, s
<i>Tripterococcus paniculatus</i> (sp. Cannington, AS George 16201)	B/P		1	p, s, e
<i>Verticordia lindleyi</i> subsp. <i>lindleyi</i>	P/B	W	4	p, s
<i>Verticordia nitens</i>	B/F			s
<i>Villarsia violifolia</i>	P/B	W (aquatic)		p, u

BASSENDAN DUNES

2.3.2 DESCRIPTIONS

Bushplan Site No.	Bushplan Map No.	System 6	Bushplan Site Name	Page No.
380	10, 11, 15, 16, 19, 20, 27	M5	Rosella Road Bushland, Bullsbrook	135
94 285 286	15		State Forest 65 - Pinjar Plantation North Bushland, Yanchep	137
96 99 101 102 103 104 105 106 107 108 126 427 432 434 433 441 448 450 452 459 461	20, 27, 28, 33	M8	State Forest 65 - Gnanagara Plantation Bushland, Pinjar	138
382	19, 20, 26, 27	M8	Lake Pinjar and Adjacent Bushland, Pinjar	139
398	27, 28, 33		Chitty Road Bushland, Pinjar	141
462	27, 28, 29		Department of Defence - Muchea Air Weapons Range Bushland, Pinjar	142
97	29		Kirby Road Bushland, Bullsbrook	144
141 146	33		Numbat Road Bushland, Mariginiup	145
399	28, 29, 33, 34, 35, 40, 41	M9	Melaleuca Park and Adjacent Bushland, Bullsbrook/Lexia	146
6	35		Cooper Road Water Reserve and Adjacent Bushland, Bullsbrook	148
324	33, 39	M8	Jandabup Lake and Adjacent Bushland, Jandabup/Mariginiup	150
326	33, 39		Hawkins Road Bushland, Jandabup/Gnangara	151
300	35, 36, 41, 42		Maralla Road Bushland, Ellenbrook/Upper Swan	153
23	41		Cardinal Drive Bushland, Ellenbrook	155
22	41		Egerton Mound Spring and Adjacent Bushland, Ellenbrook	156
193	39, 40	M8	Gnangara Lake and Adjacent Bushland, Gnangara/Lexia	158
192 195	40, 41		Wetherell Road Bushland, Lexia/Ellenbrook	160
196	39, 40, 46		Gnangara Road Bushland, Landsdale/Cullacabardee	161
198	46		Beechboro Road Bushland, Cullacabardee/Ballajura	162
304	40, 41, 46, 47	M13	Whiteman Park, Whiteman/West Swan	163
480	46		Victoria Road Bushland, Malaga/Beechboro	165
200	47		Caversham Airbase Bushland, West Swan/Whiteman	166

PMB DESCRIPTIONS

Bushplan Site No.	Bushplan Map No.	System 6	Bushplan Site Name	Page No.
307	46		Lightning Swamp and Adjacent Bushland, Noranda	168
280	50, 51	M40	Dianella Open Space	169
386	52, 58	M52	Perth Airport and Adjacent Bushland	170
48	57		Kensington Bushland, Kensington	173
228	61		Blue Gum Reserve, Brentwood/Mount Pleasant	174
337	61	M73	Booragoon Lake, Booragoon	175
339	61		Piney Lake Reserve, Winthrop	176
244	67	M93	North Lake and Bibra Lake, North Lake/Bibra Lake	177
254	67	M93	South Lake	179
256	67, 74	M93	Yangebup and Little Rush Lakes, Yangebup	181
391	74	M93	Thomsons Lake Nature Reserve and Adjacent Bushland, Beeliar	182
392	74	M93	Harry Waring Marsupial Reserve, Wattleup	184
393	74	M93	Wattleup Lake and Adjacent Bushland, Wattleup/Mandogalup	186
245	68		Ken Hurst Park, Leeming	187
388	67, 68	M94	Jandakot Airport, Jandakot	188
389	68		Acourt Road Bushland, Banjup	190
467	68		Gosnells Golf Course Bushland, Canning Vale	191
472	68		Canning Vale Prison Bushland	192
253	68		Harrisdale Swamp and Adjacent Bushland, Forrestdale	193
125	69		Holmes Street Bushland, Southern River/Huntingdale	195
413	69		Balannup Lake and Adjacent Bushland, Southern River/Forrestdale	197
340	69		Phoebe Street Bushland, Southern River	198
464	69		Matison Street Bushland, Southern River	199
465	69		Passmore Street Bushland, Southern River	201
458	67, 74		Tea Tree Close Bushland, Jandakot	202
390	68, 74, 75		Fraser Road Bushland, Banjup	203
262	75		Piarra Nature Reserve, Forrestdale	205
263	74, 75		Banjup Bushland, Banjup	206
342	69, 75, 76		Anstey/Keane Dampland and Adjacent Bushland, Forrestdale	208
344	75		Dennis De Young Reserve and Gibbs Road Swamp Bushland, Banjup/Forrestdale	209
345	75, 76	M95	Forrestdale Lake and Adjacent Bushland, Forrestdale	211
347	82, 82	M96	Wandi Nature Reserve and Anketell Road Bushland, Wandii/Oakford	213
268	81		Mandogalup Road Bushland, Mandogalup	214
269	81		The Spectacles	216
270	81		Sandy Lake and Adjacent Bushland, Anketell	217
348	82	M99	Modong Nature Reserve and Adjacent Bushland, Oakford	219
273	81, 82	M98	Casuarina Prison Bushland	220
70	89		Duckpond Bushland, Peel Estate	222
353	89	M100	Banksia Road Nature Reserve, Peel Estate	223
368	89, 95	M105	Lowlands Bushland - Eastern Block, Peel Estate	224
372	94	M105	Lowlands Bushland - Western Block (Hymus Swamp), Peel Estate	226
376	94, 99, 100		Baldivis Road Bushland, Baldivis	227
378	100		Henderson Road Bushland, Peel Estate	229
77	100, 101, 104, 105		Yangedi Swamp, Keysbrook	230

ROSELLA ROAD BUSHLAND, BULLSBROOK

Boundary Definition: protected area with bushland/bushland (part taken to cadastre) boundary (PMR boundary to north) (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. 380 **Map no.** 10, 11, 15, 16, 19, 20, 27 **Map sheet series ref. no.** 2034-I NW, 2034-I SW, 2035-II SW

System 6 (1983): Part M5, part M8, part C13 area of bushland goes beyond System area boundaries, all bushland described

Other Names

Submission Area 288, part Department of Defence
Muchea Air Weapons Range, part State Forest 65, part
Yeal Nature Reserve

Area (ha): total 8101.6; bushland 8001.6

Local Authorities (Suburb)

Shire of Wanneroo (Pinjar, Yanchep), Shire of Chittering
(Muchea), Shire of Gingin (Yeal)

Zoning

MRS: Rural, State Forest, Public Purposes-
Commonwealth Government, Public Purposes-State
Energy Commission

TPS: Rural, Water Supply, Landscape

Ownership Categories

State Government, Not identified

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

12522 Payne St; 2425, 2592, 2634, 3414, 3415, 3516,
3417, 3418 Higgins Rd; 11191 Perry Rd; Crown; 5608,
5610, 10986, 11620, 12522 street not identified
Crown Reserve

CALM Managed Land

Reserve 42450 (Conservation of Flora and Fauna and
Water), State Forest 65

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Bassendean Dunes

Bassendean Sands (Qpb: S8)

Bassendean Dunes/Pinjarra Plain

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

Wetlands (within the Spearwood and Bassendean Dunes)

Holocene Swamp Deposits (Qhw: Cps, S4)

Lagoonal and estuarine Deposits (within the Bassendean Dunes)

Lagoonal Deposits in Bassendean Dunes (Qpw: S9)

VEGETATION AND FLORA

Vegetation Complexes

Bassendean Dunes

Bassendean Complex — North

Bassendean Complex — North Transition (restricted complex, contains significant area)

Bassendean Complex — Central and South Transition (restricted complex, contains significant area, most southern occurrence)

Spearwood Dunes (revised vegetation complex boundaries exclude all Karrakatta except, possibly, on yellow sand north of Lake Pinjar, in the southwest corner of Bushplan Site: McArthur and Matiske 1985)

Karrakatta Complex — North (most southern occurrence)

Karrakatta Complex — North Transition (restricted complex, contains significant area, most northern occurrence)

Karrakatta Complex — Central and South (restricted complex, contains significant area)

Floristic Community Types

Supergroup 2: Seasonal Wetlands

5 Mixed shrub damplands

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau

21c Low lying *Banksia attenuata* woodlands or shrublands

22 *Banksia ilicifolia* woodlands

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

23b Northern *Banksia attenuata* — *B. menziesii* woodlands

REGIONAL WETLANDS

Wetland Types: sumpland, dampland, creek

Natural Wetland Groups: undefined areas included in boundary

Bassendean Dunes

Pinjar (B.1)

Jandakot (B.3)

Wetland Management Objectives: Conservation (319.3ha), Resource Enhancement

Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Not assessed

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: tall dunes, open water, vegetated wetland, creek, vegetated uplands

Vegetation and Flora: limited survey (McArthur & Mattiske 1985, Trudgen 1996; part Bushplan Site — DEP 1996 (Pinj 14), Gibson *et al.* 1994 (Pline 05–07, RAAF 02–03, Sint 01, Waterrd 01), Havel 1968 (Plots 2, 3, 32, 33, 39, 68, 82, 86; adjacent to Plots 1, 31, 36, 37, 38, 54))

Structural Units: mapping (McArthur and Mattiske 1985)

Uplands: *Banksia attenuata*, *B. menziesii* and *Eucalyptus todtiana* Low Open Forest to Low Woodland, with *Banksia ilicifolia*, *Eucalyptus calophylla* or *Nuytsia floribunda*; *Eucalyptus calophylla* and *E. marginata* Open Forest, with *Banksia grandis*; Closed Heaths to Low Shrublands dominated by *Eremaea pauciflora*, *Melaleuca aff. scabra*, *Xanthorrhoea preissii*, *Conospermum* species, *Verticordia nitens* and other species

Wetlands: Closed Forests to Low Woodlands of *Eucalyptus rudis*, *Melaleuca preissiana*, *M. raphiophylla*, *Banksia littoralis* or *B. ilicifolia* and combinations; Closed Tall Scrub to Low Shrublands dominated by *Agonis linearifolia*, *Astartea aff. fascicularis*, *Pericalymma ellipticum*, *Kunzea ericifolia*, *Melaleuca* species and others or combinations of these; Herblands dominated by *Phlebocarya ciliata* and other herbs such as *Patersonia occidentalis* often in combination with a variety of sedges; Sedgeland of *Baumea articulata*, *B.* species or *Lepidosperma longitudinale* or *Leptocarpus* species

Vegetation Condition: >90% Pristine to Excellent, <10% Very Good, with areas of localised disturbance along tracks

Total Flora: not known (estimated >200 native taxa and >30 weed species)

Significant Flora: the following are recorded from State Forest 65 and would be expected in the Bushplan Site — *Stachystemon axillaris* (4), *Conostephium minus* (4); *Verticordia nitens*, *Boronia purdieana*, *Astroloma xerophyllum*, *Stylidium crosscephalum*, *Leucopogon kingianus*

Fauna: no known information

Linkage: adjacent bushland to the south (BS382 and BS96) and north/east outside of PMR; part of proposed Greenway 37 (Tingay, Alan & Associates 1997a); part of a regionally significant contiguous bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: contains the northernmost major stands of Jarrah (also smaller areas in adjacent Gingin Water Reserve) (McArthur and Mattiske 1985); contains the steepest area of Bassendean Dunes identified on the Plain, >10m in relief adjacent to the most eastern area of the Pinjar Complex (McArthur and Mattiske 1985); recommended for protection in study of City of Wanneroo bushland (Trudgen 1996); part Bushplan Site proposed to become State Forest in Forest Management Plan 1994-2003 (CALM 1994); included in Gnaragara Park proposal (Bailey 1997)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Part Bushplan Site listed on the Register of the National Estate

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Rarity, Maintaining ecological processes or natural systems, 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 Gnaragara Mound Crown Land EPP; location of conservation category wetlands; under TPS Landscape Zoning, Planning Control Area No. 29, Crown Reserve

Recommendation: The existing purpose, care, control and management of CALM managed lands (Reserve 42450 and State Forest 65) is endorsed. The most appropriate mechanism for the protection of the remainder of this Bushplan Site to be considered through the public comment period in consultation with the land owner(s). This may include — in parts, 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; For those parts that are Vacant Crown Land, the Bushplan Site be reserved for Parks and Recreation in the Metropolitan Region Scheme and be purchased for National Park, Conservation Park, Nature Reserve or Regional Park.



STATE FOREST 65 — PINJAR PLANTATION, NORTH BUSHLAND, PINJAR

Boundary Definition: protected area with bushland boundaries (remnants in pine plantation)

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 94, 285, 286

Map no. 15

Map sheet series ref. no. 2034-I NW

Other Names: not known

Area (ha): total 87.9; bushland 87.9 (3 remnants from 3.3 to 53.4 ha)

Local Authorities (Suburb)

Shire of Wanneroo (Yanchep)

Zoning

MRS: State Forests

TPS: Landscape

Ownership Categories

State Government

Lot/Location/Reserve numbers (Purpose),

Street name

5608 street not identified

State Forest 65

CALM Managed Land

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Bassendean Dunes

Bassendean Sands (Qpb: S8)

Spearwood Dunes

Sands derived from Tamala Limestone (Qts: S7)

Tamala Limestone (Qtl: LS1)

VEGETATION AND FLORA

Vegetation Complexes

Spearwood Dunes

Karrakatta Complex — North

Floristic Community Types: not sampled, unable to infer types

Supergroup 3 - Uplands centred on Bassendean Dunes and Dandaragan Plateau

Supergroup 4 - Uplands centred on Spearwood and Quindalup Dunes

WETLANDS

No wetlands mapped

THREATENED ECOLOGICAL COMMUNITIES

Not determined

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated uplands

Vegetation and Flora: limited survey (McArthur and Matiske 1985)

Structural Units: mapping (McArthur and Matiske 1985)

Uplands: *Dryandra sessilis*, *Melaleuca huegelii* and *Grevillea* sp. Open Shrubland to Open Heath; *Banksia attenuata* and *Banksia menziesii* Low Open Forest to low Woodland

Vegetation Condition: Very Good (Connell 1995)

Total Flora: not known

Significant Flora: the Heath/Shrubland limestone vegetation is the easternmost occurrence of its type and warrants further field study

Fauna: no known information

Linkage: no adjacent native vegetation

Other Special Attributes: included in Gnangara Park proposal (Bailey 1997)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities

Opportunities and/or Constraints

Opportunities: Bushplan Site subject to Gnangara Mound Crown Land EPP; under TPS Landscape Zoning

Recommendation: The existing care, control and management of this Bushplan Site is endorsed. This site lies within the proposed 'Gnangara Park' (concept announced by Cabinet in 1996) within which areas of remnant native vegetation, such as this Bushplan Site, should be managed in the future to retain and enhance their conservation values.



STATE FOREST 65 — GNANGARA PLANTATION BUSHLAND, PINJAR

Boundary Definition: protected area with bushland (Bushplan Sites 96, 101, 102, 103, 104, 105, 107, 126, 432, 433, 441, 450, 459); protected area with bushland/conservation category wetland (Bushplan Sites 99, 106, 108, 427, 448, 452, 461); protected area with conservation category wetland (BS434) (BS434 - areas of bushland within the boundaries of the Bushplan Site are not accurately mapped. The boundary has been drawn to include any unmapped bushland; remnants in pine plantation.)

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 96, 99, 101-108, **Map no.** 20, 27, 28, 33 **Map sheet series ref. no.** 2034-I NW, 126, 427, 432-434, 441, 442, 2034-I SW, 2034-I SE
448, 450, 452, 459, 461

Other Names: not known

Area (ha): total 32.7; bushland 31.5 (21 remnants from 0.6 to 6.2 ha)

Local Authorities (Suburb)

Shire of Wanneroo (Pinjar), Shire of Swan (Bullsbrook)

Zoning

MRS: State Forests

TPS: Landscape

Ownership Categories

State Government, Private (commercial organisation)

Lot/Location/Reserve numbers (Purpose),

Street name

5607 Perry Rd; 5607 Ziatas Rd; 5607 Kirby Rd
State Forest 65

CALM Managed Land

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Bassendean Dunes/Pinjarra Plain

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

Wetlands (within the Bassendean Dunes)

Holocene Swamp Deposits (Qhw: Cps)

VEGETATION AND FLORA

Vegetation Complexes

Bassendean Dunes

Bassendean Complex — North

Wetlands

Pinjar Complex

Floristic Community Types: not sampled, unable to infer types

Supergroup 2 — Seasonal Wetlands

Supergroup 3 — Uplands centred on Bassendean Dunes and Dandaragan Plateau

WETLANDS

Wetland Types: dampland, sumpland, artificial channel

Natural Wetland Groups

Bassendean Dunes

Gnangara (B.2)

Jandakot (B.3)

Riverdale (B.4)

Wetland Management Objectives: Conservation (BS99 4.5ha, BS106 2.4ha, BS108 1.1ha, BS427 1.2ha, BS432 0.5ha, BS434 0.7ha, BS452 0.6ha), Resource Enhancement (BS96, BS101-102, BS104-105, BS107, BS126, BS461, BS459, BS448, BS450, BS461), Multiple Use (BS103)

Swan Coastal Plain Lakes EPP: none identified

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated wetlands, vegetated uplands

Vegetation and Flora: limited survey (McArthur and Mattiske 1985, Trudgen 1996)

Structural Units: only broad regional information is generally given for Bushplan Site descriptions for combined remnants in pine plantation

Scattered Native Plants: not assessed

Vegetation Condition: Very Good (Connell 1995)

Total Flora: not known

Significant Flora: the Heath/Shrubland limestone vegetation is the easternmost occurrence of its type and warrants further field study

Fauna: no known information

Linkage: adjacent native vegetation south (BS398) of BS434, south (BS459) of BS448, south (BS398) of BS126, north (BS380) of BS96 and north (BS448) of BS459; BS96 is part of contiguous; and BS126 and BS434 are parts of contiguous and fragmented bushland/wetland (Volume 2A, Map 8)

Other Special Attributes: included in Gnangara Park proposal (Bailey 1997)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities

Opportunities and/or Constraints

Opportunities: Bushplan Site/part Bushplan Site subject to Gngangara Mound Crown Land EPP; location of conservation category wetlands; under TPS Landscape Zoning

Constraints: under General Mineral Resource Area (sand)

Recommendation: The existing care, control and management of this Bushplan Site is endorsed. This site lies within the proposed 'Gngangara Park' (concept announced by Cabinet in 1996) within which areas of remnant native vegetation, such as this Bushplan Site, should be managed in the future to retain and enhance their conservation values.

LAKE PINJAR AND ADJACENT BUSHLAND, PINJAR

Boundary Definition: Conservation wetland/protected area/bushland (part taken to cadastre)/bushland group 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. 382 **Map no.** 19, 20, 26, 27 **Map sheet series ref. no.** 2034-I NW, 2034-I SW

System 6 (1983): Part M8 part System area bushland, only bushland described

Other Names

Part Submission Area 233

Local Authorities (Suburb)

Shire of Wanneroo (Pinjar, Neerabup)

Ownership Categories

State Government, Local Government, Private (including commercial organisation)

Area (ha): total 1285.4 (includes open water); bushland 735.4

Zoning

MRS: Parks and Recreation, Rural

TPS: Rural, Landscape

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

3, 4, 1896, 1897, 1969, 1970, 1971, 1972, 1973, 1974, 1975, 1976, 1981, 2493, 2494 Perry Rd; 5, 1747, 1978, 1979 Anderson Rd; 101, 102 Ziatas Rd; 2698, 2702 Old Yanchep Rd; 1, 23, 2692, 2694, 2704, 10823 Pinjar Rd; 2703, 5455 Nisa Rd; 22 street not identified
Crown Reserve

SECTION 2: REGIONAL INFORMATION**LANDFORMS AND SOILS****Bassendean Dunes**

Bassendean Sands (Qpb: S8)

Bassendean Dunes/Pinjarra Plain

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

Spearwood Dunes

Sands derived from Tamala Limestone (Qts: S7)

Wetlands (within the Spearwood and Bassendean Dune interface)

Holocene Swamp Deposits (Qhw: Cps, S4)

VEGETATION AND FLORA**Vegetation Complexes****Bassendean Dunes**

Bassendean Complex — North

Spearwood Dunes

Karrakatta Complex — Central and South

Wetlands

Pinjar Complex (restricted complex, largest intact area; boundaries modified from Heddle *et al.* 1980 in McArthur and Mattiske 1985; area reduced south but is an occurrence in RAAF land to the east, most northern occurrence)

Floristic Community Types**Supergroup 2: Seasonal Wetlands**

5 Mixed shrub damplands

10a Shrublands on dry clay flats (most northerly and only sampled occurrence off the Pinjarra Plain)

12 *Melaleuca teretifolia* and/or *Astartea* aff. *fascicularis* shrublands (most northerly occurrence)

S1 *Astartea* aff. *fascicularis*/*Melaleuca* species dense shrublands (most northerly occurrence)

S2 Northern *Pericalymma ellipticum* dense low shrublands

S3 Wet sedgelands on sandy clays

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau

21a Central *Banksia attenuata* — *Eucalyptus marginata* woodlands

22 *Banksia ilicifolia* woodlands

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

WETLANDS

Wetland Types: sumpland, creek, artificial channel

Natural Wetland Groups

Bassendean Dunes

Pinjar (B.1)

Jandakot (B.3)

Wetland Management Objectives: Conservation (1107.5ha)

Swan Coastal Plain Lakes EPP: 3ha + 160ha = 163ha (total)

THREATENED ECOLOGICAL COMMUNITIES

Not determined

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: open water, vegetated wetland, vegetated uplands

Vegetation and Flora: limited survey (DEP 1996 (Pinj 01-13, 15), McArthur and Mattiske 1985, Trudgen 1993a)

Structural Units: mapping (McArthur and Mattiske 1985, Trudgen 1993a)

Uplands: *Eucalyptus marginata* Woodland; *Banksia attenuata* and *B. menziesii* Low Open Forest to Low Woodland with scattered *Eucalyptus todtiana* and *E. marginata*; *Banksia attenuata* and *B. ilicifolia* Low Open Woodland

Wetlands: *Eucalyptus rudis* Open Forest to Open Woodland; *Acacia saligna*, *Exocarpos sparteus* and *Viminaria juncea* Low Open Woodland; *Melaleuca preissiana* and *Banksia ilicifolia* Low Woodland to Low Open Forest; Open Scrub to Tall Open Shrublands dominated by *Melaleuca teretifolia* or *Hakea varia*; Closed Heath to Low Open Heath dominated by *Hypocalymma angustifolium*, *Pericalymma ellipticum*; *Kunzea ericifolia* Open Scrub to Closed Scrub; Herblands dominated by *Stylidium* species; Closed to Open Sedgelands dominated by *Leptocarpus aristatus*, *Lepidosperma longitudinale* and combinations of *Baumea articulata*, *Lepyrodia muirii* and *Leptocarpus scariosus*

Scattered Native Plants: not assessed

Vegetation Condition: >80% Excellent to Very Good with Pristine areas, <20% Good, with areas of severe localised disturbance

Total Flora: 170 native taxa, 15 weed species (plot-generated list only, DEP 1996)

Significant Flora: *Tripterococcus paniculatus* (1), *Stylidium longitubum* (3), *Anthotium junciforme* (4); *Stylidium utricularioides*, *Burchardia bairdiae*, *Boronia purdieana*, *Hensmania turbinata*, *Stylidium crossocephalum*, *Verticordia nitens*, *Epiblema grandiflora* (large populations in wetlands)

Fauna: no systematic survey. Significant mammal species: Quenda (Friend 1996 D)

Linkage: adjacent bushland to the north (BS380), east (BS380 and BS398) and south (BS295); part of proposed Greenway 17 (Tingay, Alan & Associates 1997a); part of a regionally significant contiguous and fragmented bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: majority recommended for protection in study of City of Wanneroo bushland (Trudgen 1996); contains nine floristic community types in a unique combination; contains plant communities representative of the eastern side of the Swan Coastal Plain

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed; Indicative Place of the Register of the National Estate

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Diversity, Rarity, Maintaining ecological processes or natural systems, 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 Coastal Plain Lakes EPP; location of conservation category wetlands; under MRS Parks and Recreation Reservation and TPS Landscape Zoning, Planning Control Area No. 29, Crown Reserve

Constraints: private land; under General Mineral Resource Area (sand)

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s). Parts of the Bushplan Site are already reserved for Parks and Recreation in the Metropolitan Region Scheme and may become National Park, Conservation Park, Nature Reserve or Regional Park.

CHITTY ROAD BUSHLAND, PINJAR

Boundary Definition: protected area with bushland (part taken to cadastre)/conservation wetland 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. 398 **Map no.** 27, 28, 33 **Map sheet series ref. no.** 2034-I SE, 2034-I SW

Other Names **Area (ha):** total 1046.8 (includes open water); bushland 928.5
 State Forest East of Lake Pinjar, part Submission Area 288

Local Authorities (Suburb) **Zoning**
 Shire of Wanneroo (Pinjar), Shire of Swan (Bullsbrook) **MRS:** State Forests, Rural, Public Purposes-Commonwealth Government

Ownership Categories **Lot/Location/Reserve numbers (Purpose), Street name**
 State Government 5607 Perry Rd; 5607 Ziatas Rd; 5607 Kirby Rd
 CALM Managed Land State Forest 65

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Bassendean Dunes
 Bassendean Sands (Qpb: S8)
Bassendean Dunes/Pinjarra Plain
 Bassendean Sands over Guildford Formation (Qpb/Qpa:S10)

Wetlands (within the Bassendean Dunes)
 Holocene Swamp Deposits (Qhw: Cps)

VEGETATION AND FLORA

Vegetation Complexes
Bassendean Dunes
 Bassendean Complex — North
 Bassendean Complex — North Transition

Wetlands
 Pinjar Complex

Floristic Community Types: *not sampled, types inferred

Supergroup 2: Seasonal Wetlands

*5 Mixed shrub damplands

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau

*21c Low lying *Banksia attenuata* woodlands or shrublands

*22 *Banksia ilicifolia* woodlands

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

*23b Northern *Banksia attenuata* — *B. menziesii* woodlands

WETLANDS

Wetland Types: creek, dampland, sumpland

Natural Wetland Groups

Bassendean Dunes
 Pinjar (B.1)
 Gngara (B.2)
 Jandakot (B.3)
 Riverdale (B.4)

Wetland Management Objectives: Conservation (108.9ha), Resource Enhancement

Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Not assessed

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: open water, vegetated wetland, vegetated uplands

Vegetation and Flora: limited survey (DEP 1998 (observations from roadside), McArthur and Matiske 1985, Trudgen 1996)

Structural Units: mapping (McArthur and Matiske 1985)

Uplands: *Eucalyptus todtiana*, *Banksia attenuata*, *B. menziesii* Low Woodland with occasional *Nuytsia floribunda* and *Banksia ilicifolia*; Very Open Woodland of *Banksia menziesii*, *B. attenuata*, *B. ilicifolia* and *Nuytsia*

floribunda over mixed Shrubland dominated by *Xanthorrhoea preissii*, *Verticordia nitens*, *Regelia inops*, *Hypocalymma angustifolium*

Wetlands: *Regelia inops* Open Heath with occasional *Xanthorrhoea* sp. and occasional emergent *Banksia illicifolia*; *Regelia inops* Closed Heath with emergent trees of *Melaleuca preissiana* and *Eucalyptus rudis*; Mixed Open Low Heath dominated by *Hypocalymma angustifolium* and *Dasyopogon bromeliifolius*, *Hypocalymma angustifolium* Low Shrubland, *Phlebocarya ?ciliata*. Open Herblands

Vegetation Condition: >60% Pristine to Excellent, >20% Very Good, with areas of severe localised disturbance

Total Flora: not known

Significant Flora: the following are recorded from State Forest 65 and would be expected in the Bushplan Site — *Stachystemon axillaris* (4), *Conostephium minus* (4); *Verticordia nitens*, *Boronia purdieana*, *Hensmania turbinata*, *Astroloma xerophyllum*, *Stylidium crossocephalum*, *Leucopogon kingianus*

Fauna: no known information

Linkage: adjacent native vegetation to east (BS462 and BS399); part of proposed Greenways 37, 42 (Tingay, Alan & Associates 1997a); part of a regionally significant fragmented bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: recommended for protection in study of City of Wanneroo bushland (Trudgen 1996); included in Gngangara Park proposal (Bailey 1997)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Rarity, Maintaining ecological processes or natural systems, 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 Gngangara Mound Crown Land EPP; location of conservation category wetlands; under TPS Landscape Zoning, Planning Control Area No. 29

Constraints: under General Mineral Resource Area (sand)

Recommendation: The existing care, control and management of the CALM managed area of this Bushplan Site is endorsed. Part of this site lies within the proposed 'Gngangara Park' (concept announced by Cabinet in 1996) within which areas of remnant native vegetation, such as this Bushplan Site, should be managed in the future to retain and enhance their conservation values. The most appropriate mechanism for the protection of the remainder of this Bushplan Site to be considered through the public comment period in consultation with the land owner(s).

DEPARTMENT OF DEFENCE — MUCHEA AIR WEAPONS RANGE BUSHLAND, PINJAR

Boundary Definition: management 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. 462 **Map no.** 27, 28, 29 **Map sheet series ref. no.** 2034-I SE, 2034-I SW

Other Names: not known **Area (ha):** total 1789.7; bushland 1759.3

Local Authorities (Suburb)

Shire of Swan (Bullsbrook), Shire of Wanneroo (Pinjar),

Shire of Chittering (Muchea)

Zoning

MRS: State Forests, Public Purposes-Commonwealth Government

TPS: Landscape, Water Supply

Lot/Location/Reserve numbers (Purpose),

Street name

2723, 3353, 3848, 4784, 9019, 12522 Kirby Rd; 12522

Neaves Rd; 3399 Payne Rd

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Bassendean Dunes

Bassendean Sands (Qpb: S8)

Bassendean Dunes/Pinjarra Plain

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

Wetlands (within the Bassendean Dunes/Pinjarra Plain)

Holocene Swamp Deposits (Qhw: Cps)

VEGETATION AND FLORA

Vegetation Complexes

Bassendean Dunes

Bassendean Complex — North

Floristic Community Types: *not sampled, types inferred

Supergroup 2: Seasonal Wetlands

*4 *Melaleuca preissiana* damplands

*S2 Northern *Pericalymma ellipticum* dense low shrublands

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau

*21c Low lying *Banksia attenuata* woodlands or shrublands

*22 *Banksia ilicifolia* woodlands

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

*23b Northern *Banksia attenuata* — *B. menziesii* woodlands

WETLANDS

Wetland Types: sumpland, dampland, palusplain

Natural Wetland Groups

Bassendean—Pinjarra transition OR Bassendean with fluvial features

Muchea (B/P.3)

Bassendean Dunes

Jandakot (B.3)

Riverdale (B.4)

Wetland Management Objectives: Conservation (45.6ha), Resource Enhancement

Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Not assessed, Not determined

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated wetland, vegetated uplands

Vegetation and Flora: limited survey (Connell 1995, McArthur and Matiske 1985)

Structural Units: mapping (McArthur and Matiske 1985)

Uplands: *Banksia* species Low Open Woodland

Wetlands: *Banksia* species Low Open Woodland with occasional emergent *Eucalyptus calophylla* and *Melaleuca preissiana*; *Melaleuca preissiana*, *M. raphiophylla* and *Eucalyptus rudis* Low Open Forest to Closed Forest; Open to Closed Sedgelands

Scattered Native Plants: not assessed

Vegetation Condition: Excellent (Connell 1995)

Total Flora: not known

Significant Flora: none recorded

Fauna: no known information

Linkage: adjacent native vegetation to the south (BS399), east (BS97) and west (BS398); part of a regionally significant contiguous bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: part recommended for protection in study of City of Wanneroo bushland (Trudgen 1996)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Diversity, Maintaining ecological processes or natural systems, 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

Opportunities and/or Constraints

Opportunities: Bushplan Site/part Bushplan Site subject to Swan and Canning Rivers EPP, Gnangara Mound Crown Land EPP; location of conservation category wetlands; under TPS Landscape Zoning

Constraints: private land; under General Mineral Resource Area (sand)

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s). This may include — 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.

KIRBY ROAD BUSHLAND, BULLSBROOK

Boundary Definition: bushland (part taken to cadastre) boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 97 **Map no.** 29 **Map sheet series ref. no.** 2034-I SE

Other Names

part Submission Area 288

Local Authorities (Suburb)

Shire of Swan (Bullsbrook)

Area (ha): total 440.9; bushland 440.7

Zoning

MRS: Public Purposes-Commonwealth Government, Rural

TPS: Landscape, General Rural

Ownership Categories

Private (including commercial organisation)

Lot/Location/Reserve numbers (Purpose),

Street name

1, 2, 3, 88, 2017, 2154 Bingham Rd; 1546 Old West Rd; 1, 4 Neaves Rd; 1662 Gaston Rd; 1432 street not identified

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Pinjarra Plain

Guildford Formation (Qpa: Mgs1)

Bassendean Dunes

Bassendean Sands (Qpb: S8)

Bassendean Dunes/Pinjarra Plain

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

Wetlands (within the Bassendean Dunes)

Holocene Swamp Deposits (Qhw: Cps)

VEGETATION AND FLORA

Vegetation Complexes

Pinjarra Plain

Yanga Complex

Bassendean Dunes

Bassendean Complex — North

Floristic Community Types: *not sampled, types inferred

Supergroup 2: Seasonal Wetlands

*4 *Melaleuca preissiana* damplands

*S2 Northern *Pericalymma ellipticum* dense low shrublands

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau

*21c Low lying *Banksia attenuata* woodlands or shrublands

*22 *Banksia ilicifolia* woodlands

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

*23b Northern *Banksia attenuata* — *B. menziesii* woodlands

WETLANDS

Wetland Types: dampland, sumpland, palusplain, artificial channel

Natural Wetland Groups

Bassendean—Pinjarra transition OR Bassendean with fluvial features

Muchea (B/P.3)

Bassendean Dunes

Jandakot (B.3)

Swan Coastal Plain Rivers

Ellen Brook (R.3)

Wetland Management Objectives: Conservation (29.3ha), Resource Enhancement, Multiple Use

Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Not assessed, Not determined, Critically Endangered (communities of Tumulus Springs)

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated wetland, vegetated uplands

Vegetation and Flora: limited survey (DEP 1998 (viewed from fenceline), McArthur and Matisse 1985, Trudgen 1996)

Structural Units

Uplands: *Banksia attenuata* Low Woodland with occasional *Nuytsia floribunda*, *Allocasuarina fraseriana*, *Eucalyptus calophylla* and *Banksia ilicifolia*; Mixed *Banksia attenuata*, *B. ilicifolia* Low Open Forest, occasionally with emergent *Banksia menziesii* and *Eucalyptus calophylla*; *Adenanthos cygnorum* Tall Open Shrubland; Mixed *Xanthorrhoea ? preissii*, *Dasypogon bromeliifolius* Open Low Heath
 Wetlands: *Melaleuca preissiana* Low Open Woodland to Low Forest; *Astartea* aff. *fascicularis* Shrubland; *Astartea* aff. *fascicularis* and *Hypocalymma angustifolium* Shrubland with occasional emergent trees of *Melaleuca preissiana*; *Kunzea ericifolia* Tall Shrubland to Closed Scrub with occasional emergent *Eucalyptus calophylla*; *Regelia inops* and *Astartea* aff. *fascicularis* Open Heath; *Hypocalymma angustifolium* Shrubland with emergent *Xanthorrhoea preissii*; *Xanthorrhoea preissii* Shrubland; *Hypocalymma angustifolium* Open Low Heath

Vegetation Condition: Very Good to Good (Connell 1995)

Total Flora: not known

Significant Flora: none recorded

Fauna: no known information

Linkage: adjacent native vegetation to the south and west (BS462); part of proposed Greenway 43 (Tingay, Alan & Associates 1997a); part of a regionally significant contiguous bushland/wetland linkage (Volume 2A, Map 8)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Rarity, Maintaining ecological processes or natural systems, 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, Gngangara Mound Crown Land EPP; location of conservation category wetlands; under TPS Landscape Zoning

Constraints: private land; under General Mineral Resource Area (sand)

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s). This may include — 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.

NUMBAT ROAD BUSHLAND, MARIGINIUP

Boundary Definition: protected area with bushland (BS14); protected area with bushland/conservation wetland boundary (BS146) (remnants in pine plantation)

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 141, 146 **Map no.** 33

Map sheet series ref. no. 2034-I SW

Other Names: not known

Area (ha): total 66.6; bushland 64.4

Local Authorities (Suburb)

Zoning

Shire of Wanneroo (Mariginiup, Jandabup)

MRS: State Forests

TPS: Landscape

Ownership Categories

Lot/Location/Reserve numbers (Purpose),

State Government

Street name

65 street not identified

CALM Managed Land

State Forest 65

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Bassendean Dunes

Bassendean Sands (Qpb: S8)

Bassendean Dunes/Pinjarra Plain

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

Wetlands (within the Bassendean Dunes/Pinjarra Plain)

Holocene Swamp Deposits (Qhw: Cps)

VEGETATION AND FLORA

Vegetation Complexes

Bassendean Dunes

Bassendean Complex — North

Bassendean Complex — North Transition

Floristic Community Types: not sampled, types not inferred

WETLANDS

Wetland Types: dampland, artificial channel

Natural Wetland Groups

Bassendean Dunes

Jandakot (B.3)

Wetland Management Objectives: Conservation (4.4ha), Resource Enhancement

Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Not determined

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated wetland, vegetated uplands

Vegetation and Flora: limited survey (DEP 1998, McArthur and Matiske 1985, Trudgen 1996)

Structural Units

Uplands: *Banksia attenuata*, *B. ilicifolia*, *B. menziesii* Low Woodland; *Banksia menziesii*, *B. attenuata* Low Open Woodland

Wetlands: *Melaleuca preissiana* Low Open Forest over *Astartea* aff. *fascicularis* Open Shrubland; *Melaleuca preissiana* Low Open Woodland

Scattered Native Plants: not assessed

Vegetation Condition: >40% Excellent, >40% Very Good, <15% Good, with areas of severe localised disturbance

Total Flora: not known

Significant Flora: none recorded

Fauna: no known information

Linkage: no adjacent native vegetation

Other Special Attributes: included in Gnangara Park proposal (Bailey 1997); majority recommended for protection in study of City of Wanneroo bushland (Trudgen 1996)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, 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

Opportunities and/or Constraints

Opportunities: Bushplan Site/part Bushplan Site subject to Gnangara Mound Crown Land EPP; location of conservation category wetlands; under TPS Landscape Zoning

Constraints: under General Mineral Resource Area (sand)

Recommendation: The existing care, control and management of this Bushplan Site is endorsed. This site lies within the proposed 'Gnangara Park' (concept announced by Cabinet in 1996) within which areas of remnant native vegetation, such as this Bushplan Site, should be managed in the future to retain and enhance their conservation values.

MELALEUCA PARK AND ADJACENT BUSHLAND, BULLSBROOK/LEXIA

Boundary Definition: bushland (part taken to cadastre)/conservation wetland boundary (mostly associated with protected area) (Areas of bushland within the boundaries of the Bushplan Site are not accurately mapped.)

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 399 **Map no.** 28, 29, 33, 34, 35, 40, 41 **Map sheet series ref. no.** 2034-I SE, 2034-I SW, 2034-II NE

System 6 (1983): M9 area of bushland goes beyond System area boundaries, all bushland described

Other Names

M9, part Submission Areas 117 and 288

Local Authorities (Suburb)

Shire of Swan (Bullbrook, Ellenbrook, Lexia)

Area (ha): total 4234.9 (includes open water); bushland 4150.9

Zoning

MRS: State Forests, Rural, Parks and Recreation, Controlled Access Highways

TPS: General Rural, Landscape



Ownership Categories

State Government, Private (including commercial organisation), Not identified

Lot/Location/Reserve numbers (Purpose), Street name

5607 Asher Rd; 5607 Neaves Rd; 1570, 2294, 3231 Della South Rd; 3232 Raphael Rd; 65, 1588, 1645, 1846, 2084, 2235 Warbrook Rd; 1920, 5607 Cooper Rd; 65, 1497 Wise Rd; 70 Maralla Rd; 1556, 1558, 1564, 1653, 1952, 1999, 2253, 2254, 2794, 2828, 11937, 12188 street not identified
Crown Reserve
State Forest 65

CALM Managed Land

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Bassendean Dunes

Bassendean Sands (Qpb: S8)

Bassendean Dunes/Pinjarra Plain

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

Wetlands (within the Bassendean Dunes)

Holocene Swamp Deposits (Qhw: Cps)

VEGETATION AND FLORA

Vegetation Complexes

Pinjarra Plain

Yanga Complex

Bassendean Dunes

Bassendean Complex — North

Bassendean Complex — North Transition (restricted complex, contains significant area)

Floristic Community Types

Supergroup 2: Seasonal Wetlands

4 *Melaleuca preissiana* damplands

S2 Northern *Pericalymma ellipticum* dense low shrublands

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau

21c Low lying *Banksia attenuata* woodlands or shrublands

22 *Banksia ilicifolia* woodlands

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

23b Northern *Banksia attenuata* — *B. menziesii* woodlands

REGIONAL WETLANDS

Wetland Types: sumpland, dampland, floodplain, creek, artificial channel

Natural Wetland Groups

Bassendean—Pinjarra transition OR Bassendean with fluvial features

Muchea (B/P.3)

Bassendean Dunes

Jandakot (B.3)

Riverdale (B.4)

Wetland Management Objectives: Conservation (245.4ha), Resource Enhancement

Lakes EPP: 5.9ha + 3.4ha + 1ha + 1ha + 1.1ha = 12.4ha (total)

THREATENED ECOLOGICAL COMMUNITIES

Not assessed, Not determined

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: tall dune, open water, vegetated wetland, creek, vegetated uplands

Vegetation and Flora: limited survey (part Bushplan Site — DEP 1998 (viewed from fenceline); EPA and WAWA 1990, Gibson *et al.* 1994 (MELA 01–03, 05–10; ELE 15–16; WARB 01–04), Griffin 1994 (MP 01–11; SF 01–04), Havel 1968 (Transect 3 and Plots 8, 9, 72), Heddle 1980 (Neaves Transect), McArthur and Mattiske 1985, Muir 1983, Trudgen 1996), detailed survey (Keighery, GJ, 1996)

Structural Units: mapping (EPA and WAWA 1990, McArthur and Mattiske 1985)

Uplands: Low Open Forests to Low Open Woodlands of *Banksia attenuata*, *B. menziesii* or *B. ilicifolia* or combinations of them, sometimes with *Eucalyptus todtiana*, *Eucalyptus marginata*, *Nuytsia floribunda* or *Melaleuca preissiana* over mixed Open Heaths to Low Shrublands, sometimes with *Verticordia nitens*, *Adenanthos cygnorum*, *Xanthorrhoea preissii*, *Eremaea pauciflora* or species of *Leucopogon* or *Hibbertia*

Wetlands: Open Forests to Low Open Woodlands of *Eucalyptus rudis*, *Melaleuca preissiana*, *M. raphiophylla* or *Banksia littoralis* or combinations of them; Closed Heaths to Low Shrublands of *Astartea aff. fascicularis*, *Hypocalymma angustifolium*, *Regelia ciliata*, *Pericalymma ellipticum* or *Pultenaea reticulata* or combinations of them; Herblands dominated by *Phlebocarya ciliata* and other herbs such as *Patersonia occidentalis* often in

combination with a variety of sedges; Sedgeland of *Baumea articulata*, other *Baumea* species, *Juncus pallidus* and *Lepidosperma* species.

Scattered Native Plants: not assessed

Vegetation Condition: >5% Pristine, >85% Excellent to Very Good, <10% Good to Degraded, with areas of severe localised disturbance

Total Flora: 272 native taxa (estimated >60% expected flora, Keighery, GJ, 1996)

Significant Flora: *Caladenia huegelii* (R), *Conostephium minus* (4), *Stachystemon axillaris* (4); *Boronia purdieana*, *Verticordia nitens*, *Astroloma xerophyllum*, *Eremaea purpurea*, *Hensmania turbinata*, *Stylidium crosscephalum*, *Burchardia bairdiae*

Fauna: multiple and structured surveys for reptiles (26) and amphibians (8) (How & Dell 1994). Significant reptile species: legless lizard (*Pletholax gracilis*), dragon (*Tympanocryptis adelaidensis*), skinks (*Ctenotus gemmula*, *Egernia napoleonis* and *Acritoscincus trilineatum*), Black-headed Snake (*Rhinoplocephalus gouldii*) and Black-striped Snake (*Simoselaps calonotos*). Good assemblage of insectivorous birds including Splendid Fairy-wren and nectarivorous (J. Dell pers. comm.)

Linkage: adjacent native vegetation to the north (BS462), east (BS6, BS298 and BS300) and the west (BS398); part of proposed Greenways 41, 37, 42 (Tingay, Alan & Associates 1997a); part of a regionally significant contiguous and fragmented bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: part recommended for protection in study of City of Wanneroo bushland (Trudgen 1996); 'contains the most important example remaining in State Forest of the coastal vegetation type characteristic of the Bassendean Dune System' (DCE 1983); part of catchment for Ellenbrook and Egerton wetlands and mound springs (BS300 and BS93); part Bushplan Site proposed to become Nature Reserve in Forest Management Plan 1994-2003 (CALM 1994); included in Gngangara Park proposal (Bailey 1997)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Listed on the Register of the National Estate

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Diversity, Rarity, Maintaining ecological processes or natural systems, 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 Coastal Plain Lakes EPP, Swan and Canning Rivers EPP, Gngangara Mound Crown Land 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, Priority and General Mineral Resource Area (sand), mining tenement M70/238 (Rocla Ltd) for sand and silica

Recommendation: The existing care, control and management of the CALM managed area of this Bushplan Site is endorsed. The majority of this site lies within the proposed 'Gngangara Park' (concept announced by Cabinet in 1996) within which areas of remnant native vegetation, such as this Bushplan Site, should be managed in the future to retain and enhance their conservation values. The most appropriate mechanism for the protection of the remainder of this Bushplan Site to be considered through the public comment period in consultation with the land owner(s).

COOPER ROAD WATER RESERVE AND ADJACENT BUSHLAND, BULLSBROOK

Boundary Definition: bushland (part taken to cadastre) boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 6 **Map no. 35** **Map sheet series ref. no. 2034-I SE**

Other Names: not known

Area (ha): total 114.4; bushland 113.8

Local Authorities (Suburb)

Zoning

Shire of Swan (Bullsbrook)

MRS: Rural

TPS: General Rural

Ownership Categories

Lot/Location/Reserve numbers (Purpose),

Private

Street name

2717, 3020 street not identified

Crown Reserve

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Bassendean Dunes

Bassendean Sands (Qpb: S8)

Bassendean Dunes/Pinjarra Plain

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



Wetlands (within the Bassendean Dunes/Pinjarra Plain)

Holocene Swamp Deposits (Qhw: Cps)

VEGETATION AND FLORA

Vegetation Complexes

Pinjarra Plain

Yanga Complex

Bassendean Dunes

Bassendean Complex - North

Floristic Community Types: *not sampled, types inferred

Supergroup 2: Seasonal Wetlands

*4 *Melaleuca preissiana* damplands

*S2 Northern *Pericalymma ellipticum* dense low shrublands

*S17 *Eucalyptus rudis*/*Agonis linearifolia* wetlands in Bassendean Dunes

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau

*21c Low lying *Banksia attenuata* woodlands or shrublands

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

*23b Northern *Banksia attenuata* — *B. menziesii* woodlands

WETLANDS

Wetland Types: sumpland, palusplain, floodplain, creek

Natural Wetland Groups

Bassendean—Pinjarra transition OR Bassendean with fluvial features

Muchea (B/P.3)

Wetland Management Objectives: Conservation (49.5ha), Resource Enhancement, Multiple Use

Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Not assessed, Not determined

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated wetland, vegetated uplands

Vegetation and Flora: limited survey (DEP 1998 (surveyed from roadside), McArthur and Matiske 1985, Muir 1983, Trudgen 1996)

Structural Units

Uplands: *Banksia attenuata*, *B. menziesii* Low Woodland with occasional *Nuytsia floribunda*, *Banksia littoralis* and *Eucalyptus tottiana*

Wetlands: *Melaleuca preissiana* Closed Forest with occasional *Eucalyptus patens* over *Agonis linearifolia* Tall Shrubland; *Hypocalymma angustifolium* and *Astartea* aff. *fascicularis* Closed Heath with emergent *Xanthorrhoea preissii*; Sedgeland to Closed Sedgeland

Scattered Native Plants: not assessed

Vegetation Condition: 90% Pristine to Excellent, <10% Very Good

Total Flora: not known

Significant Flora: *Verticordia nitens*

Fauna: no known information

Linkage: adjacent native vegetation to the north, east and west (BS399); part of proposed Greenway 37 (Tingay, Alan & Associates 1997a); part of a regionally significant contiguous bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: 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, 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, Gngangara Mound Crown Land EPP; location of conservation category wetlands; under Crown Reserve

Constraints: private land; under General Mineral Resource Area (sand)

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s).

JANDABUP LAKE AND ADJACENT BUSHLAND, JANDABUP/MARIGINIUP

Boundary Definition: protected area/bushland (part taken to cadastre) 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. 324 **Map no.** 33, 39 **Map sheet series ref. no.** 2034-I SW, 2034-II NW
System 6 (1983): Part M8 area of bushland goes beyond System area boundaries, all bushland described

Other Names

Part Submission Area 233

Local Authorities (Suburb)

Shire of Wanneroo (Jandabup, Mariginiup)

Ownership Categories

Private, State Government

Area (ha): total 508.8 (includes open water); bushland 107.5

Zoning

MRS: Parks and Recreation, Rural

TPS: Rural, Landscape

Lot/Location/Reserve numbers (Purpose),

Street name

1, 4, 9, 11, 16, 500, 501, 502, 503, 504, 505, 506, 507, 510, 511, 700, 7118, 10377, 12142 Franklin Rd; 13, 17, 32, 2783, 3310 Hawkins Rd; 4, 5, 100, 1383, 1947 Townsend Rd; 31, 36, 400, 402, 403, 404, 1635, 9222, 10416 Trichet Rd; 100, 1713, 11065 Rousset Rd
 Crown Reserve
 Reserve 7349 (Conservation of Fauna)

CALM Managed Land

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Bassendean Dunes

Bassendean Sands (Qpb: S8)

Spearwood Dunes

Sands derived from Tamala Limestone (Qts: S7)

Wetlands (within the Spearwood/Bassendean Dunes)

Holocene Swamp Deposits (Qhw: Cps)

VEGETATION AND FLORA

Vegetation Complexes

Spearwood Dunes

Karrakatta Complex — Central and South

Wetlands

Pinjar Complex (most southern occurrence)

Floristic Community Types: *not sampled, types inferred

Supergroup 2: Seasonal Wetlands

*S3 Wet sedgelands on sandy clays

*S17 *Eucalyptus rudis*/*Agonis linearifolia* wetlands in Bassendean Dunes

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau

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

REGIONAL WETLANDS

Wetland Types: lake, sumpland

Natural Wetland Groups

Bassendean Dunes

Gnangara (B.2)

Wetland Management Objectives: Conservation (298.9ha), Resource Enhancement

Swan Coastal Plain Lakes EPP: 346ha

THREATENED ECOLOGICAL COMMUNITIES

Not assessed, Not determined

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: open water, vegetated wetlands, vegetated uplands

Vegetation and Flora: limited survey (DEP 1998 (including observations from roadside), EPA and WAWA 1990, McArthur and Mattiske 1985, Trudgen 1993a, WAWA 1995)

Structural Units: mapping (EPA and WAWA 1990, McArthur and Mattiske 1985, Trudgen 1993a)

Uplands: *Eucalyptus marginata* Closed Forest; *Banksia attenuata* and *B. menziesii* Low Open Forest; *Banksia attenuata*, *B. menziesii* and *Allocasuarina fraseriana* Low Open Forest; *Acacia saligna* Tall Open Scrub

Wetlands: *Eucalyptus rudis* Woodland to Open Forest; *Melaleuca raphiophylla* Low Woodland to Low Open Forest; *Viminaria juncea* Tall Open Scrub; *Astartea* aff. *fascicularis* and *Regelia ciliata* Open Heath with



emergent scattered *Melaleuca preissiana*; *Villarsia* sp. Herbland; Closed Sedgeland to Sedgeland dominated by *Baumea articulata*, *B. preissii*, *B. juncea*, *Lepyrodia muiirii* and *Leptocarpus scariosus*

Scattered Native Plants: not assessed

Vegetation Condition

Uplands: <80% Excellent to Very Good, >20% Good to Degraded, with areas of severe localised disturbance

Wetland: <70% Excellent to Pristine, >30% Very Good to Degraded, with areas of severe localised disturbance

Significant Flora: *Utricularia biflora* (only record for WA, considered a weed in Marchant *et al.* 1987 but could be native), *U. dichotoma* (only record for the Swan Coastal Plain, otherwise Stirlings/south coast)

Fauna: surveyed by RAOU (1996 D), 5 visits, for birds (76). Significant populations of Blue-billed, Musk, Australasian Shoveler and Pink-eared ducks and insectivorous passerine birds. Significant bird species: category 1 (2), category 2 (3), category 3 (8) and category 4 (3). High species richness of aquatic invertebrates (Davis *et al.* 1993, Balla and Davis 1993)

Linkage: adjacent native vegetation to the south (outside of Perth's Bushplan), east and west; part of proposed Greenways 15, 16 (Tingay, Alan & Associates 1997a); part of a regionally significant fragmented bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: 'most diverse sedge and macrophyte vegetation of all the Bassendean dune wetlands studied in the area ... appears to be the most pristine of the wetlands within the wetland suite to which it belongs' (WAWA 1995, p124-125); part recommended for protection in study of City of Wanneroo bushland (Trudgen 1996)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Part Bushplan Site - Not Listed, Indicative Place of the Register of the National Estate; part Bushplan Site - Listed on the Register of the National Estate; Location for JAMBA/CAMBA species

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Rarity, 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 Coastal Plain Lakes EPP; location of Scheduled Fauna, conservation category wetland; under MRS Parks and Recreation Reservation and TPS Landscape Zoning, Crown Reserve

Constraints: private land; under General Mineral Resource Area (sand)

Recommendation: The existing purpose, care, control and management of Reserve 7349 is endorsed. The most appropriate mechanism for the protection of the remainder of this Bushplan Site to be considered through the public comment period in consultation with the land owner(s).

HAWKINS ROAD BUSHLAND, JANDABUP/GNANGARA

Boundary Definition: protected area/bushland (part taken to cadastre) boundary (Areas of bushland within the boundaries of the Bushplan Site are not accurately mapped.)

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 326 **Map no.** 33, 39 **Map sheet series ref. no.** 2034-I SW, 2034-II NW

Other Names

East of Lake Jandabup, part Submission Area 298

Local Authorities (Suburb)

Shire of Wanneroo (Jandabup, Gnangara)

Ownership Categories

Local Government, Private (including commercial organisation), State Government

Area (ha): total 334.5; bushland 313.9

Zoning

MRS: State Forests, Rural, Parks and Recreation

TPS: Rural, Landscape

Lot/Location/Reserve numbers (Purpose),

Street name

1, 9, 11, 17, 1577 Sydney Rd; 1534 Wirrega Rd; 7 Joyce Rd; 2, 3, 4, 5, 6, 8, 10, 12, 13, 14, 16, 19, 20, 22 Pine Crest Wy; 7, 65, 1792 street not identified

State Forest 65

CALM Managed Land

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Bassendean Dunes

Bassendean Sands (Qpb: S8)

Bassendean Dunes/Pinjarra Plain

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

Wetlands (within the Bassendean Dunes/Pinjarra Plain)

Holocene Swamp Deposits (Qhw: Cps)



VEGETATION AND FLORA

Vegetation Complexes

Bassendean Dunes

- Bassendean Complex — North
- Bassendean Complex — Central and South (most northern occurrence)
- Bassendean Complex — North Transition

Wetlands

- Pinjar Complex

Floristic Community Types *not sampled, type inferred

Supergroup 2: Seasonal Wetlands

- *4 *Melaleuca preissiana* damplands
- *14 Deeper wetlands on sandy soils

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau

- 23a Central *Banksia attenuata* — *B. menziesii* woodlands
- *23b Northern *Banksia attenuata* — *B. menziesii* woodlands

REGIONAL WETLANDS

Wetland Types: dampland

Natural Wetland Groups

Bassendean Dunes

- Gnangara (B.2)
- Jandakot (B.3)

Wetland Management Objectives: Conservation (9.9ha), Multiple Use

Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Not assessed, Data Deficient (floristic community type 14)

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated wetland, vegetated uplands

Vegetation and Flora: limited survey (Trudgen 1993a; part Bushplan Site — Gibson *et al.* 1994 (Wirr 02), Trudgen 1995)

Structural Units: mapping (Trudgen 1993a)

Uplands: *Banksia attenuata*, *B. menziesii*, *Eucalyptus tottiana* and *Allocasuarina fraseriana* Low Woodland; *Banksia attenuata* and *B. menziesii* Low Open Forest; *Banksia attenuata* and *B. ilicifolia* Low Woodland; *Adenanthos cygnorum* Tall Open Shrubland; Low Shrublands to Open Heaths dominated by *Stirlingia latifolia*, *Leucopogon conostephioides*, *Acacia pulchella*, *Conospermum stoechadis*, *Hibbertia hypericoides*, *Calytrix fraseri* and *Xanthorrhoea preissii* and combinations of these

Wetlands: *Eucalyptus rudis* Woodland; *Melaleuca preissiana* and *Banksia ilicifolia* Low Woodland to Open Forest; Mixed Tall Shrubland; *Astartea* aff. *fascicularis* Open Heath to Closed Tall Scrub; *Pultenaea reticulata* Open Scrub, *Pericalymma ellipticum* Shrubland; *Hypocalymma angustifolium* Low Open Heath; *Cyathochaeta avenacea* Sedgeland

Scattered Native Plants: not assessed

Vegetation Condition: mapping (Trudgen 1993a) >30% Excellent to Pristine, <40% Very Good to Good and <30% Degraded, with areas of severe localised disturbance

Total Flora: 96 native taxa (estimated >50% expected flora) (part Bushplan Site — Trudgen 1995)

Significant Flora: *Verticordia nitens* (Trudgen 1995)

Fauna: no known information

Linkage: adjacent native vegetation to the south and west; part of a regionally significant fragmented bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: recommended for protection in study of City of Wanneroo bushland (Trudgen 1996); part Bushplan Site included in Gnangara Park proposal (Bailey 1997)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, 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 Gnangara Mound Crown Land EPP; location of conservation category wetlands; under MRS Parks and Recreation Reservation and TPS Landscape Zoning

Constraints: private land; under General Mineral Resource Area (sand)

Recommendation: The existing care, control and management of CALM managed area of this Bushplan Site is endorsed. Part of this site lies within the proposed 'Gnangara Park' (concept announced by Cabinet in 1996) within which areas of remnant native vegetation, such as this Bushplan Site, should be managed in the future to retain and

enhance their conservation values. The most appropriate mechanism for the protection of the remainder of this Bushplan Site to be considered through the public comment period in consultation with the land owner(s).

MARALLA ROAD BUSHLAND, ELLENBROOK/UPPER SWAN

Boundary Definition: protected area/ bushland taken to cadastre/bushland group/conservation wetland boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 300 **Map no.** 35, 36, 41, 42 **Map sheet series ref. no.** 2034-I SE, 2034-II NE, 2134-III NW, 2134-IV SW

Other Names

Ellenbrook Bushland Conservation Area, part Submission Areas 116 and 117

Local Authorities (Suburb)

Shire of Swan (Ellenbrook, The Vines, Upper Swan)

Area (ha): total 648.1 (includes open water); bushland 641.5

Zoning

MRS: Parks and Recreation, Rural, Urban, Controlled Access Highways, Public Purposes-Special Uses, Railways, State Forests

TPS: Landscape, Special Rural, General Rural, Special Purpose, No Zone

Lot/Location/Reserve numbers (Purpose),

Street name

(Creekline lots not identified)

1, 46, 47, 75, 76, 80, 81, 82, 83, 84, 85 Maralla Rd; 1, 5 Lexia Ave

Crown Reserve

Ownership Categories

State Government, Private (including commercial organisation), Local Government, Not identified

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Pinjarra Plain

Guildford Formation (Qpa: Mgs1, S11)

Bassendean Dunes

Bassendean Sands (Qpb: S8)

Bassendean Dunes/Pinjarra Plain

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

Wetlands (within the Bassendean Dunes/Pinjarra Plain)

Holocene Swamp Deposits (Qhw: Cps)

VEGETATION AND FLORA

Vegetation Complexes

Pinjarra Plain

Guildford Complex (none in Site)

Swan Complex

Yanga Complex

Bassendean Dunes

Bassendean Complex — North (most southern occurrence)

Bassendean Complex — North Transition (restricted complex)

Floristic Community Types: * not sampled, types inferred

Supergroup 2: Seasonal Wetlands

4 *Melaleuca preissiana* damplands

*5 Mixed shrub damplands

18 Shrublands on calcareous silts

S2 Northern *Pericalymma ellipticum* dense low shrublands

S3 Wet sedgeland on sandy clays

S5 *Acacia saligna* wetlands (restricted type, known from two localities, this is the only area in the PMR)

S6 Northern dense low shrublands (most southerly occurrence)

S17 *Eucalyptus rudis*/*Agonis linearifolia* wetlands in Bassendean Dunes

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau

21a Central *Banksia attenuata* — *Eucalyptus marginata* woodlands

21c Low lying *Banksia attenuata* woodlands or shrublands

22 *Banksia ilicifolia* woodlands

23b Northern *Banksia attenuata* — *B. menziesii* woodlands (most southerly occurrence)

S9 *Banksia attenuata* woodlands over dense low shrublands (most southerly and only occurrence)

REGIONAL WETLANDS

Wetland Types: sumpland, dampland, palusplain, floodplain, creek, river

Natural Wetland Groups

Bassendean—Pinjarra transition OR Bassendean with fluvial features

Muchea (B/P.3)

Bassendean Dunes

Jandakot (B.3)

Swan Coastal Plain Rivers

Ellen Brook (R.3)

Wetland Management Objectives: Conservation (221.6ha, 3235.3m), Resource Enhancement, Multiple Use

Swan Coastal Plain Lakes EPP: 2.2ha + 0.6ha + 63.5ha + 7.2ha + 33.9ha + 0.8ha = 108ha (total)

THREATENED ECOLOGICAL COMMUNITIES

Not assessed, Not determined, Vulnerable (floristic community type 18)

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: tall dune, open water, vegetated wetland, creek, vegetated uplands

Vegetation and Flora: detailed survey (part Bushplan Site — Weston *et al.* 1993); limited survey (part Bushplan Site — Dames and Moore 1990 and 1992c)

Structural Units: mapping (part Bushplan Site — Weston *et al.* 1993)

Uplands (mainly Bassendean Sands): Low Closed Woodlands to Low Open Woodlands of *Banksia attenuata*, *B. menziesii* or *B. ilicifolia* and combinations of them, sometimes with *Eucalyptus todtiana*, *E. calophylla* or *E. marginata*; *E. calophylla* Woodland

Wetlands: Low Closed Forests and Closed Forests to Woodlands of *Eucalyptus rudis*, *Melaleuca preissiana*, *M. raphiophylla*, *Banksia littoralis* or *Acacia saligna* and combinations; Closed Tall Scrub to Low Shrubland of *Agonis linearifolia*, *Astartea aff. fascicularis*, *Pericalymma ellipticum*, *Acacia saligna*, *Melaleuca viminea*, *Kunzea recurva*, *Regelia ciliata* or others and in combination; Mixed Herblands of species of *Utricularia*, *Styloidium*, *Drosera* and other small plants; Herblands dominated by *Phlebocarya ciliata* and other herbs such as *Patersonia occidentalis* often in combination with a variety of sedges; Sedgeland of *Baumea articulata*, *Baumea* species, *Lepidosperma longitudinale*, *Carex appressa* and *Harperia lateriflora*

Vegetation Condition: >90% Excellent to Very Good, <10% Good to Degraded, with areas of severe localised disturbance

Total Flora: 427 native taxa, 50 weeds (Weston *et al.* 1993) (area greater than that of the Bushplan Site, estimated <10% not in Site, estimated >85% expected flora)

Significant Flora: *Caladenia huegelii* (R), *Grevillea curviloba* subsp. *curviloba* (R), *Haloragis tenuifolia* (1), *Eryngium subdecumbens* ms (1), *Eryngium pinnatifidum* subsp. *palustre* ms (2), *Aotus cordifolia* (3), *Anthotium junciforme* (4), *Conostephium minus* (4), *Stachystemon axillaris* (4); *Astroloma macrocalyx*, *Burchardia bairdii*, *Blancoa canescens*, *Boronia purdieana*, *Conospermum triplinervium*, *Kunzea littoricola* ms, *Darwinia* sp. Muchea (BJK 2006), *Eremaea purpurea*, *Hibbertia perfoliata*, *Leucopogon kingianus*, *Levenhookia preissii*, *Macarthuria apetala*, *Restio stenostachyus*, *Verticordia nitens*; significant groups of species: 4 species of *Mesomelaena* recorded in Site; >30 species characteristic of heavy soils on the eastern side of the coastal plain

Fauna: limited surveys by Watkins, Bamford and Bamford (1993) for birds (57), native mammals (3), reptiles (31) and amphibians (9). Significant bird species: category 3 (13) and category 4 (10). Significant populations of Scarlet Robin, Hooded Robin, Golden Whistler, Splendid Fairy-wren, Western, Yellow-rumped and Broad-tailed Thornbills, and Australian Sittella. Significant mammal species: Quenda and Western Brush Wallaby. Significant reptile species: Spiny-tailed Gecko (*Diplodactylus spinigerus*), a dragon (*Tympanocryptis adelaidensis*), skink lizards (*Ctenotus gemmula* and *Lerista christinae*) and Black-striped Snake (*Simoselaps calonotus*)

Linkage: adjacent native vegetation to the north and south outside of the Bushplan Site, east (BS301) and west (BS399); adjacent bushland north available; part of proposed Greenways 37, 41, 68, 50 (Tingay, Alan & Associates 1997a), part of a regionally significant contiguous bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: contains diversity of floristic community types (13) and mapped vegetation types (19) (Weston *et al.* 1993); contains plant communities representative of the eastern side of the Swan Coastal Plain; outstanding flora diversity (>380 native species recorded for Bushplan Site), (i) an exceptionally large number of significant flora, (ii) high conservation value for vegetation (Weston *et al.* 1993, p. 74) including: (a) a variety of wetlands in near-pristine condition (b) many other vegetation types in excellent or better condition and (c) a series of vegetation types on a range of landform/soil complexes that are in conjunction (a conjunction which does not exist elsewhere in the PMR except possibly in Locations 1500 and 2766, north of Muchea); a relatively rich fauna compared to bushland remnants closer to Perth (Bowman Bishaw Gorham 1993, p.32); National Trust of Australia (WA) Classification; contains part of the channels (Saw Pit Gully and Ellen Brook) recommended for conservation by Semeniuk, V&C Research Group (1992); contains part of the area recommended for conservation by Semeniuk, V&C Research Group (1992); contains 4010m of regionally significant river and 728m of regionally significant creek (WRC 1996a GIS)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Listed on the Register of the National Estate



SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Diversity, Rarity, Maintaining ecological processes or natural systems, 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 Coastal Plain Lakes EPP, Swan and Canning Rivers EPP, Western Swamp Tortoise Draft 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 MRS Urban Zoning, MRD regional road requirements, General Mineral Resource Area (clay, sand)

Recommendation: The Bushplan Site is already reserved for Parks and Recreation in the Metropolitan Region Scheme and should be purchased for National Park, Conservation Park, Nature Reserve or Regional Park.

CARDINAL DRIVE BUSHLAND, ELLENBROOK

Boundary Definition: bushland taken to cadastre/conservation wetland boundary (boundary possibly subject to investigation)

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 23 **Map no. 41** **Map sheet series ref. no. 2034-II NE**

Other Names

Part Submission Area 116

Local Authorities (Suburb)

Shire of Swan (Ellenbrook, The Vines)

Area (ha): total 84.5; bushland 82.9

Zoning

MRS: Urban Deferred, Urban, Rural

TPS: Special Purpose, Landscape

Lot/Location/Reserve numbers (Purpose),

Street name

3 Bordeaux L; 3 Cardinal Dr; 408 Millhouse Rd

Ownership Categories

Private (commercial organisation); State Government

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Bassendean Dunes

Bassendean Sands (Qpb: S8)

Bassendean Dunes/Pinjarra Plain

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

Wetlands (within the Bassendean Dunes/Pinjarra Plain)

Holocene Swamp Deposits (Qhw: Cps)

VEGETATION AND FLORA

Vegetation Complexes

Pinjarra Plain

Yanga Complex (most southern occurrence)

Bassendean Dunes

Bassendean Complex - North

Combinations of Bassendean Dunes/Pinjarra Plain

Southern River Complex (most northern occurrence)

Floristic Community Types: *not sampled, types inferred

Supergroup 2: Seasonal Wetlands

5 Mixed shrub damplands

*18 Shrublands on calcareous silts

*S2 Northern *Pericalymma ellipticum* dense low shrublands

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau

*21c Low lying *Banksia attenuata* woodlands or shrublands

*23b Northern *Banksia attenuata* — *B. menziesii* woodlands

Supergroup 4: Uplands centred on Spearwood and Quindalup Dunes

25 Southern *Eucalyptus gomphocephala* — *Agonis flexuosa* woodlands (atypical member of this type associated with Muchea Limestones)

REGIONAL WETLANDS

Wetland Types: sumpland, palusplain

Natural Wetland Groups

Bassendean—Pinjarra transition OR Bassendean with fluvial features

Muchea (B/P.3)

Wetland Management Objectives: Conservation (25.8ha)

Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Not assessed, Not determined, Critically Endangered (Muchea Limestones), Vulnerable (floristic community type 18)

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: Muchea Limestone, vegetated wetland, vegetated uplands

Vegetation and Flora: DEP 1996 (Vines 01-02)

Structural Units: mapping (part Bushplan Site — Weston *et al.* 1993)

Uplands: Low Closed Woodlands to Low Open Woodlands of *Banksia attenuata*, *B. menziesii* or *B. ilicifolia* and combinations of these, sometimes with *Eucalyptus calophylla*; *Eucalyptus calophylla* Woodland

Wetlands: Low Closed Forests and Closed Forests to Woodlands of *Eucalyptus calophylla*, *E. rudis*, *Melaleuca preissiana*, *M. raphiophylla*, *Banksia littoralis* or *Acacia saligna* and combinations of these; Closed Tall Scrubs to Tall Shrublands of *Acacia saligna*, *Melaleuca raphiophylla*, *M. viminea* and *M. huegelii* or combinations of these; Open Heaths to Low Shrublands of *Astartea* aff. *fascicularis* and/or *Pericalymna ellipticum*; Mixed Herblands of species of *Stylidium*, *Drosera* and Asteraceae species; Sedgeland of *Baumea* species and *Lepidosperma longitubum*

Scattered Native Plants: not assessed

Vegetation Condition: >90% Excellent to Very Good, <10% Good to Degraded areas, with of severe localised disturbance associated with tracks

Total Flora: 427 native taxa, 50 weeds (Weston *et al.* 1993) (area greater than that of Bushplan Site, estimated <20% not in Site, estimated >85% expected flora)

Significant Flora: *Grevillea curviloba* subsp. *curviloba* (R) (largest population known in a bushland area, estimated to be less than 200 plants in the wild of this species), *Haloragis tenuifolia* (1), *Eryngium pinnatifidum* subsp. *palustre* (2), *Stylidium longitubum* (3), *Conospermum triplinervium*; at least five taxa typical of Muchea Limestones (*Grevillea curviloba* subsp. *curviloba*, *Melaleuca huegelii*, *Austrostipa flavescens*, *Anthocercis littorea*, *Daucus glochidiatus*); at least nine taxa typical of the heavy soils of the eastern side of the Swan Coastal Plain

Fauna: no systematic survey, known species list supplied in Watkins *et al.* (1993) for birds (57), native mammals (3), reptiles (31) and amphibians (9). Significant bird species: category 3 (10) and category 4 (10). Significant mammal species: Western Brush Wallaby and Quenda (Friend 1996 D). Significant reptile species: a legless lizard (*Pletholax gracilis*), Black-headed Snake (*Rhinoplocephalus gouldii*) and Black-striped Snake (*Simoselaps calonotus*).

Linkage: adjacent native vegetation to the north, south and west (connects to BS300 and BS22); part of proposed Greenway 37 (Tingay, Alan & Associates 1997a); part of a regionally significant contiguous bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: contains diversity of floristic community types (7) and mapped vegetation types (10, Weston *et al.* 1993); contains plant communities representative of the eastern side of the Swan Coastal Plain the area; contains the only intact area of Muchea Limestone communities known in the PMR and the largest known population of *Grevillea curviloba* subsp. *curviloba* which is only found on soils associated with Muchea Limestones; National Trust of Australia (WA) Classification; contains part of the area recommended for conservation by Semeniuk, V&C Research Group (1992)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Diversity, Rarity, Maintaining ecological processes or natural systems, 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 TPS Landscape Zoning

Constraints: private land; under MRS Urban Zoning and Urban Deferred Zoning, General Mineral Resource Area (sand)

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s).

EGERTON MOUND SPRING AND ADJACENT BUSHLAND, ELLENBROOK

Boundary Definition: bushland taken to cadastre/conservation wetland boundary (part Bushplan Site, wetlands, subject to Ministerial Condition No. 372, 18 November 1994)



SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 22 **Map no.** 41 **Map sheet series ref. no.** 2034-II NE

Other Names

Submission Area 115

Local Authorities (Suburb)

Shire of Swan (Ellenbrook)

Ownership Categories

Private (commercial organisation)

Area (ha): total 35.5; bushland 33.9

Zoning

MRS: Urban

TPS: Special Purpose

Lot/Location/Reserve numbers (Purpose),

Street name

148 Millhouse Rd

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Pinjarra Plain

Guildford Formation (Qpa: Mgs1)

Bassendean Dunes

Bassendean Sands (Qpb: S8)

Bassendean Dunes/Pinjarra Plain

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

Wetlands (within the Bassendean Dunes)

Holocene Swamp Deposits (Qhw: Cps)

VEGETATION AND FLORA

Vegetation Complexes

Bassendean Dunes

Bassendean Complex — North

Combinations of Bassendean Dunes/Pinjarra Plain

Southern River Complex

Floristic Community Types: *not sampled, types inferred

Supergroup 2: Seasonal Wetlands

*S17 *Eucalyptus rudis*/Agonis linearifolia wetlands in Bassendean Dunes

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau

*21c Low lying *Banksia attenuata* woodlands or shrublands

*23b Northern *Banksia attenuata* — *B. menziesii* woodlands

REGIONAL WETLANDS

Wetland Types: palusplain, sumpland, creek

Natural Wetland Groups

Bassendean—Pinjarra transition OR Bassendean with fluvial features

Muchea (B/P.3)

Bassendean Dunes

Jandakot (B.3)

Wetland Management Objectives: Conservation (21.2ha, 12m), Resource Enhancement

Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Not assessed, Not determined, Critically Endangered (Communities of Tumulus Springs)

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated wetland, creek, vegetated uplands

Vegetation and Flora: detailed survey (Tingay, Alan & Associates 1994a); limited survey (Jasinska and Knott 1994, G.J. Keighery pers. comm.)

Structural Units: mapping (Tingay, Alan & Associates 1994a)

Uplands (Bassendean Sands): *Banksia attenuata* and *B. menziesii* Low Woodland with *Eucalyptus todtiana*; *E. calophylla* and *E. marginata* Woodlands to Open Forests, with *Banksia attenuata*, *B. ilicifolia* or *B. grandis* or combinations of them

Wetlands: *Eucalyptus rudis* Closed Forest to Open Forest, often with *Melaleuca preissiana* and *Banksia littoralis*; *Melaleuca preissiana* Low Woodland to Low Open Woodland, *Melaleuca raphiophylla* Low Closed Forest, often with *Eucalyptus rudis*; Closed Heaths to Open Low Heaths of *Agonis linearifolia*, *Astartea* aff. *fascicularis*, *Hypocalymma angustifolium* or *Pericalymma ellipticum*; Sedgeland of *Baumea articulata* or *Cyathochaeta teretifolia*

Vegetation Condition: >90% Excellent to Very Good, <10% Good to Degraded, with small areas of severe localised disturbance

Total Flora: 168 native taxa, approximately 30 species of weeds expected (Tingay, Alan & Associates 1994a, with additions from Jasinska and Knott 1994 and G.J. Keighery pers. comm., WA Wildflower Society pers.

comm.) (area greater than that of Bushplan Site, estimated <20% not in Bushplan Site, estimated >75% expected native flora of Bushplan Site)

Significant Flora: *Cyathochaeta teretifolia* (3), *Aotus cordifolia* (3), *Conostephium minus* (4); *Verticordia nitens*, taxa uncommon on the Swan Coastal Plain found in association with permanent freshwater seepages or springs - *Hibbertia perfoliata*, *Lycopodium serpentinum*, *Goebelobryum unguiculatum*, *Hyalolepidozia longiscypha*

Fauna: structured survey by Tingay, Alan and Associates (1994d) for birds (38), native mammals (3), reptiles (9) and amphibians (6). Significant bird species: category 3 (3) and category 4 (2). Significant mammal species: Honey Possum and Quenda (Friend 1996 D). Significant reptile species: a legless lizard (*Pletholax gracilis*), Black-headed Snake (*Rhinoplocephalus gouldii*) and Black-striped Snake (*Simoselaps calanotus*). Contains a rich and diverse aquatic invertebrate fauna (Jasinska and Knott 1994)

Linkage: adjacent bushland to north (outside BS); part of proposed Greenway 37 (Tingay, Alan & Associates 1997a)

Other Special Attributes: the only Ellen Brook mound spring studied by Jasinska and Knott (1994) without degraded vegetation and with a new, monotypic genus of amphipod discovered in 1994; only known occurrence of the club moss *Lycopodium serpentinum* and the leafy liverworts *Goebelobryum unguiculatum* and *Hyalolepidozia longiscypha* in the PMR dependent on water regime in spring; National Trust of Australia (WA) Classification; contains part of the area recommended for conservation by Semeniuk, V&C Research Group (1992)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Listed on the Register of the National Estate

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Diversity, Rarity, Maintaining ecological processes or natural systems, 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

Constraints: private land; under MRS Urban Zoning, Priority and General Mineral Resource Area (sand)

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s). (Note: Part Bushplan Site, wetlands, subject to Ministerial Condition No. 372, 18 November 1994.)

GNANGARA LAKE AND ADJACENT BUSHLAND, GNANGARA/LEXIA

Boundary Definition: protected area/bushland boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 193 **Map no.** 39, 40 **Map sheet series ref. no.** 2034-II NE, 2034-II NW
System 6 (1983): Part M8 area of bushland goes beyond System area boundaries, all bushland described

Other Names

Part Submission Area 233

Local Authorities (Suburb)

Shire of Wanneroo (Gnangara)

Ownership Categories

Private (including commercial organisation), State Government, Local Government

Area (ha): total 301.8 (includes open water); bushland 162.3

Zoning

MRS: Parks and Recreation, State Forests

TPS: Landscape

Lot/Location/Reserve numbers (Purpose),

Street name

1, 50, 2470 Alexander Dr; 51, 883, 970 Gnangara Rd; 5199, 7817, 7818, 11838, 12417 Sydney Rd; 65 Steel Rd; Crown; 0 street not identified

Crown Reserve

State Forest 65

CALM Managed Land

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Bassendean Dunes

Bassendean Sands (Qpb: S8)

Bassendean Dunes/Pinjarra Plain

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

Spearwood Dunes

Sands derived from Tamala Limestone (Qts: S7)

Wetlands (within the Spearwood/Bassendean Dunes)

Holocene Swamp Deposits (Qhw: Cps)

VEGETATION AND FLORA

Vegetation Complexes

Bassendean Dunes

- Bassendean Complex — North
- Bassendean Complex — Central and South
- Bassendean Complex — North Transition

Floristic Community Types

Supergroup 2: Seasonal Wetlands

- S3 Wet sedgeland on sandy clays
- S17 *Eucalyptus rudis*/*Agonis linearifolia* wetlands in Bassendean Dunes

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau

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

REGIONAL WETLANDS

Wetland Types: lake

Natural Wetland Groups

Bassendean Dunes

- Gnangara (B.2)
- Jandakot (B.3)

Wetland Management Objectives: Conservation (117.3ha)

Swan Coastal Plain Lakes EPP: 124.3ha

THREATENED ECOLOGICAL COMMUNITIES

Not assessed, Not determined

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: open water, vegetated wetland, vegetated uplands

Vegetation and Flora: limited survey (DEP 1996 (Gnan 01-03), EPA and WAWA 1990, Trudgen 1993a, WAWA 1995)

Structural Units: mapping (EPA and WAWA 1990, Trudgen 1993a)

Uplands: *Banksia attenuata*, *B. menziesii*, *Eucalyptus todtiana* Low Open Woodland; *Eucalyptus marginata* Open Forest; *Banksia attenuata* and *B. menziesii* Low Open Forest; *Banksia attenuata*, *B. ilicifolia*, *B. menziesii*, *Nuytsia floribunda* and *Eucalyptus todtiana* Low Open Woodland

Wetlands: *Eucalyptus rudis* Open Forest; *Melaleuca raphiophylla* Low Open Forest to Closed Forest; Mixed Closed Herbland; Mixed Closed Sedgeland; Closed Sedgelands of *Baumea articulata* and *B. juncea*

Vegetation Condition: mapping (Trudgen 1993a) >75% Very Good to Excellent, <25% Good to Degraded, with areas of severe localised disturbance

Total Flora: 170 native taxa, 15 weeds (plot-generated list only) (estimated >50% expected flora)

Significant Flora: *Cyathochaeta teretifolia* (3)

Fauna: surveyed by RAOU (1996 D), 2 visits, for birds (50). Significant populations of Musk Duck and insectivorous passerine birds including Splendid Fairy-wren and Western Thornbill. Significant bird species: category 1 (1), category 2 (3), category 3 (5) and category 4 (4)

Linkage: adjacent native vegetation to the north, south (BS196) and west; part of proposed Greenway 22, 14 (Tingay, Alan & Associates 1997a); part of a regionally significant fragmented bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: Indicative Place on Register of the National Estate Database; recommended for protection in study of City of Wanneroo bushland (Trudgen 1996)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed; Indicative Place on register of the National Estate; Location for JAMBA/CAMBA species; part Bushplan Site included in Gnangara Park proposal (Bailey 1997)

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Rarity, 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 Coastal Plain Lakes EPP, Gnangara Mound Crown Land EPP; location of Scheduled Fauna, conservation category wetlands; under MRS Parks and Recreation Reservation and TPS Landscape Zoning, Crown Reserve

Constraints: private land; under General Mineral Resource Area (sand), mining tenement M70/163 (Boral Resources)

Recommendation: The existing care, control and management of CALM managed lands within this Bushplan Site is endorsed. Part of this site lies within the proposed 'Gnangara Park' (concept announced by Cabinet in 1996)

within which areas of remnant native vegetation, such as this Bushplan Site, should be managed in the future to retain and enhance their conservation values. The most appropriate mechanism for the protection of the remainder of this Bushplan Site to be considered through the public comment period in consultation with the land owner(s).

WETHERELL ROAD BUSHLAND, LEXIA/ELLENBROOK

Boundary Definition: bushland (part taken to cadastre) boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 192, 195 **Map no.** 40, 41 **Map sheet series ref. no.** 2034-II NE

Other Names: not known

Area (ha): total 44.3; bushland 40.7

Local Authorities (Suburb)

Zoning

Shire of Swan (Ellenbrook)

MRS: State Forests

TPS: Landscape

Ownership Categories

Lot/Location/Reserve numbers (Purpose),

State Government

Street name

65 Gngara Rd

Crown Reserve

State Forest 65

CALM Managed Land

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Bassendean Dunes

Bassendean Sands (Qpb: S8)

Bassendean Dunes/Pinjara Plain

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

VEGETATION AND FLORA

Vegetation Complexes

Bassendean Dunes

Bassendean Complex — Central and South

Bassendean Complex — North Transition (most southern occurrence)

Floristic Community Types: *not sampled, types inferred

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau

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

WETLANDS

No wetlands mapped

THREATENED ECOLOGICAL COMMUNITIES

Not assessed

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated uplands

Vegetation and Flora: limited survey (DEP 1998 viewed from fenceline)

Structural Units

Uplands: *Banksia menziesii*, *B. ilicifolia*, *B. attenuata*, *Eucalyptus tottiana* Low Open Forest with emergent *E. calophylla*; *Allocasuarina fraseriana* Woodland over *Banksia ilicifolia*, *Eucalyptus tottiana*, *Nuytsia floribunda* mixed Low Open Woodland

Scattered Native Plants: not assessed

Vegetation Condition: 5% Excellent, <60% Very Good, >30% Good, with areas of severe localised disturbance

Total Flora: not known

Significant Flora: none recorded

Fauna: no systematic survey. Significant mammal species: Quenda (Friend 1996 D)

Linkage: no adjacent native vegetation (BS399 across road to north); part of proposed Greenways 22, 14 (Tingay, Alan & Associates 1997a); part of contiguous and fragmented bushland/wetland linkages (Volume 2A, Map 8)

Other Special Attributes: included in Gngara Park proposal (Bailey 1997)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Criteria not relevant to determination of conservation value, but which may be applied when evaluating areas having similar values



Opportunities and/or Constraints

Opportunities: Bushplan Site/part Bushplan Site subject to Swan and Canning Rivers EPP, Gngangara Mound Crown Land EPP; under TPS Landscape Zoning, Crown Reserve
 Constraints: under Priority and General Mineral Resource Area (sand), mining tenement M70/238 (Rocla Ltd) for sand and silica

Recommendation: The existing care, control and management of this Bushplan Site is endorsed. This site lies within the proposed 'Gngangara Park' (concept announced by Cabinet in 1996) within which areas of remnant native vegetation, such as this Bushplan Site, should be managed in the future to retain and enhance their conservation values.

GNANGARA ROAD BUSHLAND, LANDSDALE/CULLACABARDEE

Boundary Definition: bushland (part taken to cadastre)/conservation wetland boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 196 **Map no.** 39, 40, 46 **Map sheet series ref. no.** 2034-II NE, 2034-II NW

Other Names

Part Submission Area 299, Telecommunication Centre

Local Authorities (Suburb)

Shire of Wanneroo (Landsdale), Shire of Swan (Cullacabardee)

Area (ha): total 362.9; bushland 281.9

Zoning

MRS: Public Purposes-Special Uses, Rural, Important Regional Roads

TPS: General Rural, Landscape

Lot/Location/Reserve numbers (Purpose),

Street name

1, 10 Gngangara Rd; 5, 55 Park St

Ownership Categories

Commonwealth Government, State Government

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Bassendean Dunes

Bassendean Sands (Qpb: S8)

Bassendean Dunes/Pinjarra Plain

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

Wetlands (within the Bassendean Dunes/Pinjarra Plain)

Holocene Swamp Deposits (Qhw: Cps)

VEGETATION AND FLORA

Vegetation Complexes

Bassendean Dunes

Bassendean Complex — Central and South

Floristic Community Types: *not sampled, types inferred

Supergroup 2: Seasonal Wetlands

*4 *Melaleuca preissiana* damplands

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau

*21c Low lying *Banksia attenuata* woodlands or shrublands

*22 *Banksia ilicifolia* woodlands

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

REGIONAL WETLANDS

Wetland Types: dampland, palusplain

Natural Wetland Groups

Bassendean—Pinjarra transition OR Bassendean with fluvial features

Bennett Brook (B/P.4)

Bassendean Dunes

Gngangara (B.2)

Jandakot (B.3)

Wetland Management Objectives: Conservation (27.5ha), Resource Enhancement, Multiple Use

Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Not assessed

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated wetland, vegetated uplands

Vegetation and Flora: limited survey (DEP 1996, 1998, fenceline observations; Matiske Consulting Pty Ltd 1997)



Structural Units

Uplands: *Eucalyptus calophylla* Woodland; *Eucalyptus calophylla* and *E. marginata* Woodland; *Banksia menziesii*, *B. attenuata* and *B. ilicifolia* Low Woodland; *Banksia menziesii* and *B. attenuata* Low Woodland; *Banksia menziesii*, *B. attenuata* Low Open Forest with scattered emergent *Eucalyptus calophylla*; *Xanthorrhoea brunonis* Open Low Heath with *Verticordia nitens* and *Stirlingia latifolia*

Wetlands: *Melaleuca preissiana* and *Eucalyptus calophylla* Woodland; *Verticordia nitens* Open Heath with scattered emergent *Banksia ilicifolia*, *B. menziesii* and *Melaleuca preissiana*; Mixed *M. preissiana*, *Banksia attenuata*, *B. menziesii* Low Open Forest, with scattered emergent trees of *Eucalyptus calophylla*; Closed to Open Low Heaths dominated by *Astartea* aff. *fascicularis*, *Hypocalymma angustifolium* and *Pericalymma ellipticum*; Mixed Sedgeland of *Lyginia barbata* and *Loxocarya flexuosa*

Scattered Native Plants: not assessed

Vegetation Condition: 80% Excellent, 15% Very Good, with areas of severe localised disturbance

Total Flora: not known

Significant Flora: *Verticordia nitens*

Fauna: no systematic survey. Significant mammal species: Quenda (Friend 1996 D)

Linkage: adjacent native vegetation to the north (BS193 across a road), south (BS198 across a road) and east; part of proposed Greenways 14, 22 (Tingay, Alan & Associates 1997a); part of a regionally significant fragmented bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: recommended for protection in study of City of Wanneroo bushland (Trudgen 1996)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Rarity, 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 conservation category wetlands; under TPS Landscape Zoning

Constraints: under MRD regional requirements, General Mineral Resource Area (sand)

Recommendation: The most appropriate mechanisms for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s). This may include — 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.

BEECHBORO ROAD BUSHLAND, CULLACABARDEE/BALLAJURA

Boundary Definition: bushland (part taken to cadastre) boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 198 **Map no.** 46 **Map sheet series ref. no.** 2034-II NE

Other Names: not known

Area (ha): total 497.2; bushland 458.1

Local Authorities (Suburb)

Zoning

Shire of Swan (Cullacabardee, Ballajura)

MRS: Rural, Important Regional Roads

TPS: Landscape, General Rural

Ownership Categories

Lot/Location/Reserve numbers (Purpose),

State Government

Street name

1, 2, 125, 126 Hepburn Ave; 51, 52, 123, 124, 10042

Marangaroo Dr; 1, 1000 street not identified

Crown Reserve

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Bassendean Dunes

Bassendean Sands (Qpb: S8)

Bassendean Dunes/Pinjarra Plain

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

VEGETATION AND FLORA

Vegetation Complexes

Bassendean Dunes

Bassendean Complex — Central and South

Combinations of Bassendean Dunes/Pinjarra Plain

Southern River Complex

Floristic Community Types: *not sampled, types inferred

Supergroup 2: Seasonal Wetlands

*4 *Melaleuca preissiana* damplands

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau

*21c Low lying *Banksia attenuata* woodlands or shrublands

*22 *Banksia ilicifolia* woodlands

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

WETLANDS

Wetland Types: dampland, palusplain

Natural Wetland Groups

Bassendean—Pinjarra transition OR Bassendean with fluvial features

Bennet Brook (B/P.4)

Wetland Management Objectives: Conservation (91.2ha), Resource Enhancement, Multiple Use

Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Not assessed

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated wetland, vegetated uplands

Vegetation and Flora

Structural Units: limited survey (DEP 1996, Mattiske Consulting Pty. Ltd. 1997)

Uplands: *Eucalyptus calophylla* Woodland over Low Woodlands to Low Open Woodlands dominated by *Melaleuca preissiana* and *Banksia ilicifolia*; Low Woodland dominated by *Allocasuarina fraseriana*, *Banksia attenuata* and *B. menziesii* with scattered *Eucalyptus todtiana*

Wetlands: *Eucalyptus calophylla* Forest to Open Woodland over *Melaleuca preissiana* Open Woodland; *Eucalyptus calophylla* and *Acacia saligna* Woodland

Scattered Native Plants: not assessed

Vegetation Condition: <10% Excellent, >90% Very Good to Good, with areas of severe localised disturbance

Significant Flora: *Verticordia nitens*

Fauna: no known information

Linkage: adjacent native vegetation to the north (BS196 across road), south and east (BS304 across road); part of a regionally significant fragmented bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: recommended for protection in study of Shire of Wanneroo bushland (Trudgen 1996)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, 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, Gngangara Mound Crown Land EPP; location of conservation category wetlands; under TPS Landscape Zoning, Crown Reserve

Constraints: under MRD regional road requirements

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s).

WHITEMAN PARK, WHITEMAN/WEST SWAN

Boundary Definition: protected area/bushland 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. 304 **Map no.** 40, 41, 46, 47 **Map sheet series ref. no.** 2034-II NE

System 6 (1983): M13, part M41 part System area bushland, only bushland described

Other Names

Mussel Pool

Area (ha): total 2514.9; bushland 1416.2



Local Authorities (Suburb)
Shire of Swan (Whiteman, West Swan)

Ownership Categories
State Government, Private

Zoning
MRS: Parks and Recreation, Rural
TPS: Landscape, General Rural
Lot/Location/Reserve numbers (Purpose),
Street name
2, 3 Woolcott Ave; 3 Dulwich St; 54, 626 Cranleigh St;
1, 20 Harrow St; 20 Gngangara Rd; 11, 21, 22, 58 Park
St; 1, 99 street not identified

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Pinjarra Plain

Guildford Formation (Qpa: Mgs1) (Qha: Mc1)

Bassendean Dunes

Bassendean Sands (Qpb: S8)

Bassendean Dunes/Pinjarra Plain

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

Wetlands (within the Bassendean Dunes/Pinjarra Plain)

Holocene Swamp Deposits (Qhw: Cps)

VEGETATION AND FLORA

Vegetation Complexes

Bassendean Dunes

Bassendean Complex — Central and South

Combinations of Bassendean Dunes/Pinjarra Plain

Southern River Complex

Floristic Community Types

Supergroup 2: Seasonal Wetlands

4 *Melaleuca preissiana* damplands

S17 *Eucalyptus rudis*/*Agonis linearifolia* wetlands in Bassendean Dunes

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau

21c Low lying *Banksia attenuata* woodlands or shrublands

22 *Banksia ilicifolia* woodlands

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

WETLANDS

Wetland Types: dampland, floodplain, palusplain, sumpland, lake, creek, artificial channel

Natural Wetland Groups

Bassendean—Pinjarra transition OR Bassendean with fluvial features

Bennett Brook (B/P.4)

Wetland Management Objectives: Conservation (336.5ha), Resource Enhancement, Multiple Use

Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Not assessed, Not determined

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated wetland, creek, vegetated uplands

Vegetation and Flora: detailed survey (Arnold *et al.* 1991, part Bushplan Site — Jackson *et al.* 1975), Matiske & Associates 1989; limited survey (DEP 1996 (White 03-08), Gibson *et al.* 1994 (White 01-02), Griffin 1994 (WIS 01-02))

Structural Units: mapping (Arnold *et al.* 1991, Jackson *et al.* 1975; Matiske & Associates 1989)

Uplands (mainly Bassendean Sands): *Eucalyptus calophylla* Woodland to Low Open Woodland, often with *E. marginata*, *Melaleuca preissiana*, *Banksia ilicifolia* or *B. grandis* and combinations of these, and generally over *Verticordia nitens* or mixed Open Low Heath to Low Shrubland; Low Open Forest to Low Open Woodland dominated by *Banksia attenuata*, *B. menziesii*, *B. ilicifolia*, *Allocasuarina fraseriana* or *Eucalyptus tottiana* and combinations of these

Wetlands: Open Forest to Low Open Forest of *Eucalyptus rudis*, *Melaleuca preissiana*, *M. raphiophylla* or *Banksia littoralis* and combinations; Heaths and Shrublands of *Melaleuca lateritia*, *Astartea aff. fascicularis*, *Pericalymma ellipticum* and others; Sedgelands of *Baumea ?vaginata*, *Lepidosperma longitudinale*, *Cyathochaeta teretifolia* and other species

Scattered Native Plants: not assessed

Vegetation Condition: >70% Very Good to Excellent, <30% Good to Degraded, with areas of severe localised disturbance

Total Flora: 340 native taxa, 76 weeds (Mattiske & Associates 1989; with additions from DEP 1996 (White 03-08), Gibson *et al.* 1994 (WHITE 01-02); and pers. comm. D. Bright, H. Gratte, J. Wann, T. Comber, A. Brown, Native Orchid Group, WA Wildflower Society) (estimated >85% expected flora)

Significant Flora: *Cyathochaeta teretifolia* (3), *Aotus cordifolia* (3), *Isopogon drummondii* (3) (Mattiske & Associates 1989), *Stachystemon axillaris* (4), *Conostephium minus* (4), *Verticordia lindleyi* subsp. *lindleyi* (4); *Astroloma xerophyllum*, *Eremaea fimbriata*, *Verticordia nitens*, *Conospermum triplinervium*, *Boronia purdieana*, *Burchardia bairdiae*, *Drosera macrantha* (swamp form)

Fauna: multiple and structured surveys by Jackson *et al.* (1975) and Arnold *et al.* (1991) for birds (103), native mammals (6), reptiles (30) and amphibians (8). Rich assemblage of insectivorous and nectarivorous birds. Significant bird species: category 1 (2), category 3 (13) and category 4 (13). Significant mammal species: Ash-grey Mouse, Honey Possum, Quenda and Western Brush Wallaby. Rich reptile assemblage including a dragon (*Tympanocryptis adelaidensis*), Black-headed Snake (*Rhinoplocephalus gouldii*), a gecko (*Diplodactylus alboguttatus*), skink lizards (*Bassiana trilineata* and *Ctenotus gemmula*) and Rosenberg's Monitor (*Varanus rosenbergii*). Significant reptile species: Black-striped Snake (*Simoselaps calanotos*)

Linkage: adjacent native vegetation to the south (BS305) and west; part of proposed Greenway 41, 22, 39, 21, 40, 33 (Tingay, Alan & Associates 1997a); part of a regionally significant fragmented bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: rich and diverse flora and fauna, with a relatively large number of significant species, including the largest known stands of the significant sedge *Cyathochaeta teretifolia*; contains part of the channel (Bennett Brook) recommended for conservation by Semeniuk, V&C Research Group (1992); contains area of significant undeveloped remnant vegetation and/or regional open space identified by Semeniuk, V&C Research Group (1992); contains 956m of regionally significant river (WRC 1996a GIS)

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, Criteria not relevant to determination of conservation value, but which may be applied when evaluating areas having similar values

Opportunities and/or Constraints

Opportunities: Bushplan Site/part Bushplan Site subject to Swan and Canning Rivers EPP, Gngangara Mound Crown Land EPP; location of Scheduled Fauna, conservation category wetlands; under MRS Parks and Recreation Reservation and TPS Landscape Zoning

Constraints: under General Mineral Resource Area (sand)

Recommendation: The existing purpose, care, control and management of this Bushplan Site is endorsed.

VICTORIA ROAD BUSHLAND, MALAGA/BEECHBORO

Boundary Definition: bushland (part taken to cadastre)/conservation wetland boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 480 **Map no.** 46

Map sheet series ref. no. 2034-II NE

Other Names: not known

Area (ha): total 21.2; bushland 20.6

Local Authorities (Suburb)

Zoning

Shire of Swan (Malaga, Beechboro)

MRS: Industrial, Controlled Access Highways

TPS: Highway Service, Industrial Development, Landscape

Ownership Categories

State Government, Private (including commercial organisation)

Lot/Location/Reserve numbers (Purpose),

Street name

20, 282, 283, 284, 285, 286, 293, 294, 295, 296, 297, 298, 299 Victoria Rd; 21 Truganina Rd; 16, 17 Della Rd; 1 street not identified

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Pinjarra Plain

Guildford Formation (Qpa: Mgs1)

Bassendean Dunes

Bassendean Sands (Qpb: S8)

VEGETATION AND FLORA

Vegetation Complexes

Combinations of Bassendean Dunes/Pinjarra Plain/Spearwood Dunes

Southern River Complex

Floristic Community Types *not sampled, types inferred

Supergroup 2: Seasonal Wetlands

*S2 Northern *Pericalymma ellipticum* dense low shrublands

*4 *Melaleuca preissiana* damplands

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau

*21c Low lying *Banksia attenuata* woodlands or shrublands

*22 *Banksia ilicifolia* woodlands

WETLANDS

Wetland Types: sumpland

Natural Wetland Groups

Bassendean Dunes

Jandakot (B.3)

Wetland Management Objectives: Conservation (7.9ha)

Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Not assessed, Not determined

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated uplands, vegetated wetland

Vegetation and Flora: limited survey (DEP 1998, surveyed from roadside)

Structural Units

Uplands: Low Open Forest to Low Open Woodland dominated by *Banksia attenuata*, *B. menziesii*, *B. ilicifolia* or *Allocasuarina fraseriana* and combinations of these

Wetlands: Heaths and Shrublands of *Astartea* aff. *fascicularis*, *Pericalymma ellipticum* and others; Sedgeland of *Lepidosperma longitudinale*, *Leptocarpus* species and other species

Vegetation Condition: >70% Excellent to Very Good, <30% Good with areas of severe localised disturbance

Total Flora: not known

Significant Flora: none recorded

Fauna: no known information

Linkage: adjacent bushland west and north; part of proposed Greenway 39 (Tingay, Alan & Associates 1997a); part of regionally significant potential bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: part of a complex group of wetlands

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria met for inclusion: Representation of ecological communities, Diversity, 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 conservation category wetlands; under TPS Landscape Zoning

Constraints: private land; under MRS Industrial Zoning, MRD regional road requirements

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s).

CAVERSHAM AIRBASE BUSHLAND, WEST SWAN/WHITEMAN

Boundary Definition: protected area boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 200

Map no. 47

Map sheet series ref. no. 2034-II NE

Other Names

Submission Area 199

Area (ha): total 139.4; bushland 97.0

Local Authorities (Suburb)

Shire of Swan (West Swan)

Zoning

MRS: Parks and Recreation, Important Regional Roads

TPS: Rural

Ownership Categories

Commonwealth Government

Lot/Location/Reserve numbers (Purpose),

Street name

1 Harrow St



SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Pinjarra Plain

Guildford Formation (Qpa: Mgs1)

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

S1 *Astartea* aff. *fascicularis*/*Melaleuca* species dense shrublands

S2 Northern *Pericalymma ellipticum* dense low shrublands

S7 Northern woodlands to forests over tall sedgeland alongside permanent wetlands

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau

21a Central *Banksia attenuata* — *Eucalyptus marginata* woodlands

REGIONAL WETLANDS

Wetland Types: palusplain, sumpland, artificial channel

Natural Wetland Groups

Bassendean—Pinjarra transition OR Bassendean with fluvial features

Bennett Brook (B/P.4)

Wetland Management Objectives: Resource Enhancement, Multiple Use

Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Not assessed, Not determined

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated uplands, vegetated wetlands

Vegetation and Flora: limited survey (DEP 1996 (Cavs 02, 06-07, 09-11))

Structural Units

Uplands: *Eucalyptus marginata* Woodland to Open Woodland over *Banksia attenuata* and *B. menziesii* Low Woodland; *Eucalyptus calophylla* Tall Woodland

Wetlands: *Melaleuca raphiophylla* and *Eucalyptus rudis* Closed Forest; *Melaleuca preissiana* Low Woodland; *Hypocalymma angustifolium* and *Pericalymma ellipticum* Open Low Heath

Scattered Native Plants: not assessed

Vegetation Condition: >60% Very Good, <40% Good to Degraded, with areas of severe localised disturbance

Total Flora: 110 native taxa, 33 weeds (plot-generated list only)

Significant Flora: *Kunzea littoricola* ms, *Burchardia bairdiae*

Fauna: no known information

Linkage: adjacent native vegetation to the north and west; part of proposed Greenway 40 (Tingay, Alan & Associates 1997a)

Other Special Attributes: contains area of significant undeveloped remnant vegetation and/or regional open space identified by Semeniuk, V&C Research Group (1992)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Rarity, 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

Opportunities and/or Constraints

Opportunities: Bushplan Site/part Bushplan Site subject to Swan and Canning Rivers EPP; under MRS Parks and Recreation Reservation

Constraints: under MRD regional road requirements, General Mineral Resource Area (clay)

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s). This may include parts for which — 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.

LIGHTNING SWAMP AND ADJACENT BUSHLAND, NORANDA

Boundary Definition: protected area/bushland boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 307 **Map no.** 46 **Map sheet series ref. no.** 2034-II NE

Other Names

Submission Area 178

Local Authorities (Suburb)

Shire of Swan (Noranda), City of Bayswater (Noranda)

Area (ha): total 74.1; bushland 72.6

Zoning

MRS: Parks and Recreation, Controlled Access Highways

TPS: Landscape

Ownership Categories

State Government, Private, Local Government

Lot/Location/Reserve numbers (Purpose),

Street name

56 Malaga Rd; 1, 42 Reid Hwy; 44 Crimea St; 1 Nannup Mews; 100 street not identified; Crown

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Bassendean Dunes

Bassendean Sands (Qpb: S8)

Bassendean Dunes/Pinjarra Plain

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

Wetlands (within the Bassendean Dunes/Pinjarra Plain)

Holocene Swamp Deposits (Qhw: Cps)

VEGETATION AND FLORA

Vegetation Complexes

Bassendean Dunes

Bassendean Complex — Central and South

Combinations of Bassendean Dunes/Pinjarra Plain

Southern River Complex

Floristic Community Types

Supergroup 2: Seasonal Wetlands

4 *Melaleuca preissiana* damplands

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau

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

REGIONAL WETLANDS

Wetland Types: sumpland, dampland, artificial channel

Natural Wetland Groups

Bassendean Dunes

Jandakot (B.3)

Wetland Management Objectives: Conservation (0.7ha), Resource Enhancement

Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Not assessed

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: open water, vegetated wetland, vegetated uplands

Vegetation and Flora: limited survey (DEP 1996 (Light 01-04))

Structural Units

Uplands: *Banksia attenuata* and *B. menziesii* Low Woodland with scattered *Eucalyptus tottiana*; Low Open Forest to Low Woodland dominated by *Banksia attenuata*, *B. menziesii*, *B. ilicifolia* or *Nuytsia floribunda* and combinations of these; *Phlebocarya ciliata* Herblands

Wetland: *Eucalyptus rudis* Woodland to Open Forest; *Melaleuca preissiana* Low Open Woodland

Vegetation Condition: >80% Very Good to Excellent, <20% Good to Degraded, with areas of severe localised disturbance

Total Flora: 112 native, 13 weeds (plot-generated list only, DEP 1996)

Significant Flora: *Macarthuria apetala*, *Astroloma xerophyllum*



Fauna: limited survey by Murdoch University (1996) for birds (29), reptiles (5) and amphibians (4). Significant bird species: category 3 (4) and category 4 (3)

Linkage: no adjacent native vegetation; part of proposed Greenway 39 (Tingay, Alan & Associates 1997a); part of a regionally significant fragmented bushland/wetland linkage (Volume 2A, Map 8)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, 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 conservation category wetlands; under MRS Parks and Recreation Reservation and TPS Landscape Zoning

Constraints: private land; under MRD regional road requirements

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s). This may include — 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.

DIANELLA OPEN SPACE

Boundary Definition: protected area boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 280 Map no. 50, 51 Map sheet series ref. no. 2034-II SE, 2034-II SW
System 6 (1983): M40 part System area bushland, only bushland described

Other Names

M40 Dianella Open Space

Local Authorities (Suburb)

City of Stirling (Dianella)

Ownership Categories

State Government

Area (ha): total 38.7; bushland 16.0

Zoning

MRS: Parks and Recreation

TPS: Landscape

Lot/Location/Reserve numbers (Purpose),

Street name

201 Alexander Dr; 9506 Morley Dr

Crown Reserve

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Bassendean Dunes

Bassendean Sands (Qpb: S8)

Bassendean Dunes/Pinjarra Plain

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

Wetlands (within the Bassendean Dunes/Pinjarra Plain)

Holocene Swamp Deposits (Qhw: Cps)

VEGETATION AND FLORA

Vegetation Complexes

Bassendean Dunes

Bassendean Complex — Central and South

Floristic Community Types

Supergroup 2: Seasonal Wetlands

4 *Melaleuca preissiana* damplands

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau

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

REGIONAL WETLANDS

Wetland Types: artificial lake, artificial channel

Natural Wetland Groups (undefined areas included in boundary)

Bassendean Dunes

Jandakot (B.3)

Wetland Management Objectives: Conservation (0.9ha)

Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Not assessed

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated wetlands, vegetated uplands

Vegetation and Flora: limited survey (DEP 1996 (Dian 01-02))

Structural Units

Uplands: *Banksia attenuata* and *B. menziesii* Low Woodland with scattered emergent trees of *Eucalyptus marginata*

Wetlands: *Melaleuca preissiana* Low Woodland

Vegetation Condition: >70% Very Good to Excellent, <30% Good to Degraded, with areas of severe localised disturbance

Total Flora: 77 native taxa, 10 weeds (plot-generated list only) (estimated >50% expected flora)

Significant Flora: none recorded

Fauna: multiple and structured surveys by Western Australian Museum of Natural Science (How *et al.* 1996) for birds (29), reptiles (13) and amphibians (4). Significant bird species: category 4 (2). Significant reptile species: a gecko (*Diplodactylus polyophthalmus*)

Linkage: no adjacent native vegetation; part of proposed Greenway 29 (Tingay, Alan & Associates 1997a)

Other Special Attributes: National Trust of Australia (WA) classification

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, 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

Opportunities and/or Constraints

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

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.

PERTH AIRPORT AND ADJACENT BUSHLAND

Boundary Definition: bushland (part taken to cadastre) boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 386 **Map no.** 52, 58 **Map sheet series ref. no.** 2034-II SE

System 6 (1983): M52 Part System area bushland, only bushland described

Other Names: not known

Area (ha): total 771.4 (includes open water); bushland 632.3

Local Authorities (Suburb)

Shire of Swan (Perth Airport, South Guildford), Shire of Kalamunda (High Wycombe), City of Belmont (Forrestfield, Perth Airport)

Zoning

MRS: Public Purposes-Commonwealth Government, Railways, Controlled Access Highways, Important Regional Roads, Public Purposes-Special Uses
TPS: Landscape



Ownership Categories

Commonwealth Government, State Government

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

12001 Queens Rd; 1, 2, 54, 55, 56, 12001 Kalamunda Rd; 0, 1, 2, 3, 7, 382, 384, 385, 386, 387, 389, 392, 394, 395, 396, 422, 423, 425, 426, 462, 464, 471, 472, 500, 501, 548, 812, 813, 814, 815, 816, 817, 818, 824, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 847, 850, 852, 853, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 873, 874, 875, 876, 1349, 6246, 8794, 8795, 8898, 10570, 11872 Horrie Miller Dr; 0 Dundas Rd; 1 Waterhall Rd; 0, 164, 710, 1307, 1380 Wittenoom Rd; 1, 3, 476, 477, 808, 809 Grogan Rd; 0, 1, 2, 6, 8681, 10488 street not identified
Crown Reserve

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Pinjarra Plain

Guildford Formation (Qpa: Mgs1)

Bassendean Dunes

Bassendean Sands (Qpb: S8)

Bassendean Dunes/Pinjarra Plain

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

Wetlands (within the Bassendean Dunes and Pinjarra Plain)

Holocene Swamp Deposits (Qhw: Cps)

VEGETATION AND FLORA

Vegetation Complexes

Pinjarra Plain

Guildford Complex

Bassendean Dunes

Bassendean Complex — Central and South

Combinations of Bassendean Dunes/Pinjarra Plain

Southern River Complex

Floristic Community Types *not sampled, types inferred

Supergroup 2: Seasonal Wetlands

4 *Melaleuca preissiana* damplands

5 Mixed shrub damplands

7 Herb-rich saline shrublands in clay pans

*11 Wet forests and woodlands

12 *Melaleuca teretifolia* and/or *Astartea* aff. *fascicularis* shrublands

*15 Forests and woodlands of deep seasonal wetlands

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau

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

20b Eastern *Banksia attenuata* and/or *Eucalyptus marginata* woodlands (most northerly occurrence)

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

WETLANDS

Wetland Types: lake, sumpland, dampland, palusplain, artificial channel, creek

Natural Wetland Groups

Bassendean—Pinjarra transition OR Bassendean with fluvial features

Mungala (B/P.2)

Wetland Management Objectives: Conservation (229ha), Resource Enhancement, Multiple Use

Swan Coastal Plain Lakes EPP: 30.4ha

THREATENED ECOLOGICAL COMMUNITIES

Not assessed, Endangered (floristic community types 20a, 20b), Vulnerable (floristic community types 7, 15)

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: open water, vegetated wetlands, vegetated uplands

Vegetation and Flora: detailed survey (Tingay, Alan & Associates 1994c); limited survey (DEP 1996 (Perth 01-10), Keighery, BJ, 1995e, DEP 1998)

Structural Units: mapping (Tingay, Alan & Associates 1994c)

Uplands: *Eucalyptus calophylla* Woodland; *Eucalyptus marginata* Woodland; *Eucalyptus rudis* Woodland; *Banksia attenuata*, *B. menziesii* and *Allocasuarina fraseriana* Woodland; *Banksia attenuata*, *B. menziesii* and *B. ilicifolia* Woodland



Wetlands: *Banksia littoralis* Low Woodland to Forest; *Melaleuca preissiana* Low Woodland; *Melaleuca raphiophylla* Low Woodland; *Melaleuca raphiophylla* and *Eucalyptus rudis* Forest; *Jacksonia sternbergiana* Closed Tall Scrub to Tall Shrubland; *Jacksonia furcellata* Open Shrubland; *Adenanthos cygnorum* Shrubland; *Kunzea ericifolia* Tall Shrubland; *Hakea varia* Closed Heath; *Regelia ciliata* Shrubland; *Astartea* aff. *fascicularis* Closed Heath; *Pericalymma ellipticum* Shrubland; *Melaleuca teretifolia* Open to Closed tall Scrub; *Melaleuca viminea* Open Heath; Mixed Open Heath; *Acacia saligna* Shrubland to Open Tall Scrub; Sedgelands of *Leptocarpus* species, *Baumea articulata* and *Typha domingensis*

Scattered Native Plants: not assessed

Vegetation Condition: >60% Excellent to Very Good, <40% Good to Degraded (mapping Tingay, Alan & Associates 1994c)

Total Flora: 295 native taxa (Tingay, Alan & Associates 1994c, DEP 1996) (estimated >70% expected flora)

Significant Flora: *Conospermum undulatum* (R); *Eucalyptus marginata* subsp. *elegantella* (1), *Tripterococcus paniculatus* ms (1), *Myriophyllum echinatum* (3), *Stylidium longitubum* (3), *Haemodorum loratum* (3), *Conostephium minus* (4), *Villarsia submersa* (4), *Verticordia lindleyi* subsp. *lindleyi* (4); *Platysace juncea*, *Byblis gigantea*, *Conospermum triplinervium* (hybrids with *C. undulatum*), *Levenhookia preissii* (rarely recorded on the Swan Coastal Plain), *Cheilanthes austrotenuifolia* (Tingay, Alan & Associates 1994c, uncommon on the Plain, associated with communities that are heavily cleared), *Verticordia nitens* (Tingay, Alan & Associates 1994c, only currently recorded population south of Gnangara in the Perth Metropolitan Region), *Villarsia violifolia* (uncommon on Plain); 34 taxa associated with eastern side of the Plain, possible location for *Macarthuria keigheryi* (R)

Fauna: multiple and structured surveys by RAOU, Western Australian Museum of Natural Science and others for birds (87), native mammals (2), reptiles (20) and amphibians (8) (How and Dell 1994, RAOU (1996 D), Tingay, Alan & Associates 1994b). Significant bird species: category 3 (2) and category 4 (7). Munday Swamp is in the top 6% of wetlands for breeding waterbirds (Jaensch *et al.* 1993). Significant mammal species: Quenda and Echidna. Significant reptile species: 1970 record of Western Swamp Tortoise. Rich frog assemblage typical of the eastern side of the Swan Coastal Plain. Only two other areas match the vertebrate species richness in the Perth Metropolitan Region. The only significant populations of two WA endemic fish, the western Pygmy Perch (*Edelia vittata*) and Western Minnow (*Galaxis occidentalis*) in the PMR (Robson and Charter 1989). Munday Swamp has an unusually rich and diverse invertebrate fauna (82 species), including several rare species

Linkage: no adjacent bushland; part of proposed Greenways 111, 26, 123, 124 (Tingay, Alan & Associates 1997a); part of a regionally significant fragmented bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: Munday Swamp and adjacent lands and lands to the north are considered to be of Aboriginal heritage value (Australian Archaeological Survey Consultants 1995); a number of uplands and wetlands are suitable for Western Swamp Tortoise release (Kuchling and Burbidge 1996); Munday Swamp, Runway Swamp, Link Road Swamp and sumplands east of the main runway are wetlands of national significance (ANCA 1996); National Trust of Australia (WA) Classification; contains a substantial sweep of soils and communities from eastern to central Plain (Bassendean Sands); contains plant communities representative of the eastern side of the Swan Coastal Plain

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Interim list of the Register of the National Estate; Directory of Important Wetlands in Australia.

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 Coastal Plain Lakes EPP, Swan and Canning Rivers EPP; location of Declared Rare Flora and Scheduled Fauna, conservation category wetlands; under TPS Landscape Zoning, Crown Reserve

Constraints: under MRD regional road requirements, requirements for domestic and international airport

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owners. This may include parts for which: The conservation values of the Bushplan Site to be protected through one or more of a range of complementary mechanisms to encourage and secure conservation management on private lands; The specific approach to be determined in consultation/negotiation with the land owner(s), but will generally include conservation covenants/management agreements.

KENSINGTON BUSHLAND, KENSINGTON

Boundary Definition: bushland (part taken to cadastre and zoning) boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 48 **Map no.** 57 **Map sheet series ref. no.** 2034-II SE

Other Names **Area (ha):** total: 9.2; bushland: 9.1

Submission Area 212

Local Authorities (Suburb)
Town of Victoria Park (Kensington)

Zoning
MRS: Urban
TPS: Landscape

Ownership Categories
Local Government

Lot/Location/Reserve numbers (Purpose),
Street name
705 Anketell St
Crown Reserve

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Bassendean Dunes
Bassendean Sands (Qpb: S8)

VEGETATION AND FLORA

Vegetation Complexes
Bassendean Dunes
Bassendean Complex — Central and South

Floristic Community Types

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau
23a Central *Banksia attenuata* — *B. menziesii* woodlands

WETLANDS

No wetlands mapped

THREATENED ECOLOGICAL COMMUNITIES

Not assessed

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated uplands

Vegetation and Flora: detailed survey (Cranfield and Parker 1992); limited survey (DEP 1996 (Kens 01))

Structural Units: mapping (Cranfield and Parker 1992)

Uplands: *Eucalyptus marginata*, *B. menziesii* and *B. attenuata* Forest to Woodland; *Banksia menziesii* and *B. attenuata* Woodland; mixed Low Shrubland

Vegetation Condition: >75% Excellent to Very Good, <25% Good to Degraded

Total Flora: 146 native taxa, 60 weeds (estimated >90% expected flora) (Cranfield and Parker 1992)

Significant Flora: Cranfield and Parker 1992 - *Dodonaea hackettiana* (4)

Fauna: multiple and structured survey by Turpin (1990, 1991) for birds (20), reptiles (14) and amphibians (1). Significant bird species: category 1 (2) and category 4 (2). One of only two known localities south of the Swan River for the gecko *Diplodactylus alboguttatus*

Linkage: no adjacent bushland

Other Special Attributes: managed by the City of Victoria Park as a bushland reserve

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Rarity, Scientific or evolutionary importance, Criteria not relevant to determination of conservation value, but which may be applied when evaluating areas having similar values

Opportunities and/or Constraints

Opportunities: Bushplan Site subject to Swan and Canning Rivers EPP; location of Scheduled Fauna; Crown Reserve

Constraints: under MRS Urban Zoning

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s). This may include — 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.



BLUE GUM RESERVE, BRENTWOOD/MOUNT PLEASANT

Boundary Definition: protected area/bushland boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 228 **Map no.** 61 **Map sheet series ref. no.** 2033-I NW

Other names: not known

Area (ha): total 9.9 (includes open water); bushland 2.9

Local Authorities (Suburb)

Zoning

City of Melville (Brentwood, Mt Pleasant)

MRS: Urban

TPS: Landscape, Local Open Space

Ownership Categories

Local Government, State Government

Lot/Location/Reserve numbers (Purpose),

Street name

1694, 2381 Canning Ave; 488, 3423 Moolyee Rd; 3451

Disney St

Crown Reserve

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Spearwood Dunes

Sands derived from Tamala Limestone (Qts: S7)

Lagoonal and estuarine Deposits (within the Quindalup Spearwood Bassendean Dunes Pinjarra Plain)

Lagoonal and estuarine deposits (Vasse) (Qhg: Sm2)

VEGETATION AND FLORA

Vegetation Complexes

Bassendean Dunes

Bassendean Complex — Central and South

Floristic Community Types: *not sampled, types inferred

Supergroup 2: Seasonal Wetlands

*5 Mixed shrub damplands

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau

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

WETLANDS

Wetland Types: sumpland

Natural Wetland Groups

Bassendean Dunes

Jandakot (B.3)

Wetland Management Objectives: Conservation (5.6ha)

Swan Coastal Plain Lakes EPP: 5.7 ha

THREATENED ECOLOGICAL COMMUNITIES

Not assessed

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: open water, vegetated wetland, vegetated uplands

Vegetation and Flora: limited survey (City of Melville 1992, EPA and WAWA 1990, Keighery, BJ, 1996a)

Structural Units: limited survey (City of Melville 1992, EPA and WAWA 1990)

Uplands: *Banksia menziesii*, *B. attenuata* and *B. ilicifolia* Low Woodland, with scattered *Allocasuarina fraseriana* and *Eucalyptus marginata*

Wetlands: Mixed *Melaleuca raphiophylla*, *M. preissiana* and *Eucalyptus rudis* Woodland to Low Closed Forest; *Eucalyptus rudis* Low Open Forest; *Acacia saligna* Tall Open Scrub

Scattered Native Plants: *Eucalyptus calophylla* Open Woodland — regionally significant vegetation recognised as being included in the area of Bushplan Site in need of protection

Vegetation Condition: >60% Good to Very Good, <40% Degraded, with areas of severe localised disturbance

Total Flora: 62 native taxa, 19 weeds (City of Melville 1992) (estimated >75% expected flora)

Significant Flora: none recorded

Fauna: surveyed by RAOU (1996 D), 5 visits, and Street (1992) for birds (73). Significant populations of Blue-billed and Hardhead Ducks and Dusky Moorhen. Significant bird species: category 1 (1), category 2 (2), category 3 (6) and category 4 (4)

Linkage: no adjacent bushland

Other Special Attributes: included in Beelii Regional Park Proposal (DPUD 1992a)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Register of the National Estate; Location for JAMBA/CAMBA species

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Diversity, Rarity, Maintaining ecological processes or natural systems, 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

Opportunities and/or Constraints

Opportunities: Bushplan Site/part Bushplan Site subject to Swan Coastal Plain Lakes EPP, Swan and Canning Rivers EPP; location of Scheduled Fauna, conservation category wetland; under TPS Landscape Zoning and Local Open Space Zoning, Crown Reserve

Constraints: under MRS Urban Zoning

Recommendation: The care, control and management of this Bushplan Site for conservation purposes within Beeliar Regional Park is endorsed.

BOORAGOON LAKE, BOORAGOON

Boundary Definition: bushland taken to zoning boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 337 Map no. 61 Map sheet series ref. no. 2033-I NW

System 6 (1983): M73 Part System area bushland and part scattered native plants (canopy), all vegetation described

Other names: not known

Area (ha): total 13.3 (includes open water); bushland 9.9

Local Authorities (Suburb)
City of Melville (Booragoon)

Zoning
MRS: Urban, Other Major Highways
TPS: Landscape, Local Open Space, Public Use Reserve
Lot/Location/Reserve numbers (Purpose),

Ownership Categories
State Government, Local Government

Street name
1672, 2306 Leach Hwy; 681 Aldridge Rd

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Spearwood Dunes

Sands derived from Tamala Limestone (Qts: S7) (near interface of Bassendean and Spearwood Dunes)

Wetlands (near the Spearwood/Bassendean Dune interface)

Holocene Swamp Deposits (Qhw: Msp)

VEGETATION AND FLORA

Vegetation Complexes

Bassendean Dunes

Bassendean Complex — Central and South (near interface of Bassendean Complex — Central and South and Karrakatta Complex — Central and South)

Floristic Community Types: *not sampled, type inferred

Supergroup 2: Seasonal Wetlands

*12 *Melaleuca teretifolia* and/or *Astartea* aff. *fascicularis* shrublands

WETLANDS

Wetland Types: lake

Natural Wetland Groups

Bassendean Dunes

Jandakot (B.3)

Wetland Management Objectives: Conservation (12.1ha)

Swan Coastal Plain Lakes EPP: 8.9ha

THREATENED ECOLOGICAL COMMUNITIES

Not assessed

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: open water, vegetated wetland, vegetated uplands



Vegetation and Flora: detailed survey (Smith 1985a); limited survey (EPA and WAWA 1990)
Structural Units: mapping (EPA and WAWA 1990, Smith 1985a)
 Wetlands: *Eucalyptus rudis* Closed Forest; *Melaleuca raphiophylla* Low Closed Forest; *Melaleuca teretifolia* Closed Tall Scrub; *Polypogon* Closed Heath; mixed Closed Sedgeland
Scattered Native Plants: *Pteridium esculentum* Fernland
Vegetation Condition: >50% Good to Very Good, <50% Degraded, with areas of severe localised disturbance (Weston 1993)
Total Flora: 34 native taxa, 6 weeds (estimated >90% of expected flora, (Smith 1985a))
Significant Flora: none recorded
Fauna: surveyed by RAOU (1996 D), 5 visits, and Smith (1985a) for birds (53) and limited survey by Smith (1985a) for reptiles (1). Significant populations of Blue-billed, Musk, and Hardhead Ducks and Dusky Moorhen. Major breeding colony of Little Pied Cormorants. Significant bird species: category 3 (6) and category 4 (2)
Linkage: no adjacent bushland; part of a regionally significant potential bushland/wetland linkage (Volume 2A, Map 8)
Other Special Attributes: included in Beelii Regional Park Proposal (DPUD 1992a)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed; Directory of Important Wetlands in Australia

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, 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

Opportunities and/or Constraints

Opportunities: Bushplan Site/part Bushplan Site subject to Swan Coastal Plain Lakes EPP, Swan and Canning Rivers EPP; location of conservation category wetland; under TPS Landscape Zoning and Local Open Space Zoning

Constraints: under MRS Urban Zoning, MRD regional road requirements

Recommendation: The care, control and management of this Bushplan Site for conservation purposes within Beelii Regional Park is endorsed.

PINEY LAKE RESERVE, WINTHROP

Boundary Definition: protected area boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 339 **Map no.** 61 **Map sheet series ref. no.** 2033-I NW

Other names

Submission Area 14

Local Authorities (Suburb)

City of Melville (Winthrop)

Area (ha): total: 68.208 (includes open water); bushland 31.934

Zoning

MRS: Parks and Recreation

TPS: Landscape

Lot/Location/Reserve numbers (Purpose),

Street name

2 street not identified

Crown Reserve

Ownership Categories

State Government

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Spearwood Dunes

Sands derived from Tamala Limestone (Qts: S7)

Wetlands (near the Spearwood Bassendean Dune interface)

Holocene Swamp Deposits (Qhw: Msp)

VEGETATION AND FLORA

Vegetation Complexes

Bassendean Dunes

Bassendean Complex — Central and South

Spearwood Dunes

Karrakatta Complex — Central and South

Floristic Community Types: *not sampled, type inferred

Supergroup 2: Seasonal Wetlands

*5 Mixed shrub damplands

WETLANDS

Wetland Types: sumpland

Natural Wetland Groups

Bassendean Dunes

Jandakot (B.3)

Wetland Management Objectives: Conservation (16ha)

Swan Coastal Plain Lakes EPP: 19.8ha

THREATENED ECOLOGICAL COMMUNITIES

Not assessed

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: open water, vegetated wetland, vegetated uplands

Vegetation and Flora: detailed survey (Ecoscape and Landmarc 1992, Rodda 1986); limited survey (Le Provost *et al.* 1985b, Weston 1993)

Structural Units: mapping (Ecoscape and Landmarc 1992, Le Provost *et al.* 1985b, Rodda 1986)

Uplands: *Eucalyptus calophylla*, *E. marginata*, *Banksia attenuata* Open Woodland; *Eucalyptus calophylla* Low Woodland; *Acacia saligna* Closed Scrub; *Adenanthos cygnorum* Low Shrubland

Wetlands: *Banksia littoralis* and *Melaleuca preissiana* Open Woodland to Low Forest; *Melaleuca preissiana*, *M. raphiophylla* Low Woodland to Low Open Forest; *Baumea articulata* and *Typha domingensis* Sedgeland with emergent shrubs of *Astartea aff. fascicularis*

Scattered Native Plants: *Macrozamia riedlei* Open Shrubland

Vegetation Condition: >30% Very Good to Excellent, <20% Good, 50% Degraded, with areas of severe localised disturbance (Weston 1993)

Total Flora: 111 native taxa (estimated >80% expected flora) (Rodda 1986, Ecoscape and Landmarc 1992)

Significant Flora: *Aotus cordifolia* (3) (Rodda 1986)

Fauna: limited survey by Rodda (1986) for birds (60), native mammals (2), reptiles (3) and amphibians (6). Significant bird species: category 1 (1), category 3 (10) and category 4 (4). Significant mammal species: Quenda (Friend 1996 D)

Linkage: no adjacent bushland; part of proposed Greenways 97, 103 (Tingay, Alan & Associates 1997a); part of a regionally significant potential bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: included in Beeliiar Regional Park Proposal (DPUD 1992a)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Rarity, 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

Opportunities and/or Constraints

Opportunities: Bushplan Site/part Bushplan Site subject to Swan Coastal Plain Lakes EPP, Swan and Canning Rivers EPP; location of Scheduled Fauna, conservation category wetlands; under MRS Parks and Recreation Reservation and TPS Landscape Zoning, Crown Reserve

Recommendation: The care, control and management of this Bushplan Site for conservation purposes within Beeliiar Regional Park is endorsed.

NORTH LAKE AND BIBRA LAKE, NORTH LAKE/BIBRA LAKE

Boundary Definition: protected area/bushland boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 244 **Map no.** 67 **Map sheet series ref. no.** 2033-I NW

System 6 (1983): Part M93 Part System area bushland, only bushland described

Other Names: not known

Area (ha): total 398.5 (includes open water); bushland 127.2

Local Authorities (Suburb)

City of Cockburn (North Lake, Bibra Lake)

Zoning

MRS: Parks and Recreation, Controlled Access Highways, Urban

TPS: Landscape, Residential



Ownership Categories

State Government, Local Government, Private
(commercial organisation)

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

0, 54, 55, 56, 57, 58, 59, 552, 2121 Progress Dr; 37,
72, 2550 Farrington Rd; 552 Gwilliam Dr; 53, 2033
Bibra Rd; 0, 20, 35, 100 Bibra Dr; 38, 39 Dixon Rd; 0,
1, 2, 3, 39, 40, 65, 387, 485 Hope Rd; 50 Parkway Rd;
10, 100, 536, 2016 Forrest Rd; 1 North Lake Rd; Closed;
0, 59, 303, 304 street not identified

Crown Reserve

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Bassendean Dunes

Bassendean Sands (Qpb: S8)

Spearwood Dunes

Sands derived from Tamala Limestone (Qts: S7)

Wetlands (within the Spearwood/Bassendean Dune interface)

Holocene Swamp Deposits (Qhw: Mps)

VEGETATION AND FLORA

Vegetation Complexes

Bassendean Dunes

Bassendean Complex — Central and South

Spearwood Dunes

Karrakatta Complex — Central and South

Wetlands

Herdsmen Complex

Floristic Community Types: *not sampled, types inferred

Supergroup 2: Seasonal Wetlands

11 Wet forests and woodlands

*12 *Melaleuca teretifolia* and/or *Astartea* aff. *fascicularis* shrublands

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau

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

Supergroup 4: Uplands centred on Spearwood and Quindalup Dunes

28 Spearwood *Banksia attenuata* or *B. attenuata* — *Eucalyptus* woodlands

WETLANDS

Wetland Types: lake, sumpland

Natural Wetland Groups

Spearwood—Bassendean interface

Bibra (S/B.1)

Wetland Management Objectives: Conservation (235ha)

Swan Coastal Plain Lakes EPP: 3ha, 6.6ha and 31.4ha (41ha total)

THREATENED ECOLOGICAL COMMUNITIES

Not assessed

SECTION 3: SPECIFIC SITE DETAIL

North Lake

Landscape Features: open water, vegetated wetland, vegetated uplands

Vegetation and Flora: limited survey (part Bushplan Site - DEP 1996 (Beel 01-03), EPA and WAWA 1990, Newman 1976, Weston 1993)

Structural Units: mapping (EPA and WAWA 1990, Cockburn Wetlands Committee 1976)

Uplands: *Eucalyptus marginata* Open Forest; *Banksia attenuata*, *B. menziesii* and *Allocasuarina fraseriana* Low Open Forest, with emergent *Eucalyptus marginata*

Wetlands: *Eucalyptus rudis*, *Melaleuca preissiana*, *M. raphiophylla* and *Banksia ilicifolia* Forest to Woodland, with *Kunzea ericifolia*, *Acacia saligna* and *Agonis linearifolia*; *Melaleuca teretifolia* Tall Shrubland; *Baumea articulata* and **Typha orientalis* Sedgelands

Vegetation Condition: >60% Very Good to Excellent, >30% Good to Degraded, with areas of severe localised disturbance (Weston 1993)

Total Flora: not known

Significant Flora: limited survey (Weston 1993), *Aotus cordifolia* (3); *Jacksonia gracilis*, *Villarsia violifolia*

Fauna: surveyed by RAOU (1996 D), 16 visits, for birds (71). Significant populations of Australasian Shoveler, Hardhead and Blue-billed, Musk, and Pink-eared Ducks. Significant bird species: category 1 (1), category 3 (9) and category 4 (4). Significant mammal species: Quenda (Friend 1996 D)

Linkage: adjacent bushland to the north, south (BS254) and west; part of proposed Greenway 89 (Tingay, Alan & Associates 1997a); part of a regionally significant contiguous bushland/wetland linkage (Volume 2A, Map 8)

Bibra Lake

Landscape Features: open water, permanent salt lake, vegetated wetland, vegetated uplands

Vegetation and Flora: limited survey (EPA and WAWA 1990, Keighery, BJ, 1996a, Newman 1976, Weston 1993)

Structural Units: mapping (EPA and WAWA 1990, Newman 1976)

Uplands: *Banksia attenuata*, *B. menziesii* and *Allocasuarina fraseriana* Low Open Forest, with *Eucalyptus marginata*

Wetlands: *Eucalyptus rudis*, *Melaleuca preissiana* and *M. raphiophylla* Open Forests; *Melaleuca teretifolia* Low Closed Forest or Closed Tall Scrub; Closed Sedgeland

Remnant Vegetation: not assessed

Vegetation Condition: >20% Good to Very Good, <80% Degraded, with areas of severe localised disturbance

Total Flora: not known

Significant Flora: *Dodonaea hackettiana* (4)

Fauna: surveyed by RAOU (1996 D), 56 visits, for birds (112). Significant populations of Australasian Shoveler, Hardhead and Blue-billed, Musk, and Pink-eared Ducks. Significant bird species: category 1 (1), category 2 (4), category 3 (14) and category 4 (8). Significant mammal species: Quenda (Friend 1996 D)

Linkage: bushland linkage to north (across road); part of proposed Greenway 103 (Tingay, Alan & Associates 1997a)

Other Special Attributes: included in Beeliar Regional Park Proposal (DPUD 1992a)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Interim list of the Register of the National Estate

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Rarity, 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

Opportunities and/or Constraints

Opportunities: Bushplan Site/part Bushplan Site subject to Swan Coastal Plain Lakes EPP; location of Scheduled Fauna, conservation category wetlands; under MRS Parks and Recreation Reservation and TPS Landscape Zoning, Crown Reserve

Constraints: private land; under MRS Urban Zoning, MRD regional road requirements

Recommendation: The care, control and management of this Bushplan Site for conservation purposes within Beeliar Regional Park is endorsed.

SOUTH LAKE

Boundary Definition: protected area/bushland boundary (at times open water mapped as bushland)

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 254 **Map no.** 67 **Map sheet series ref. no.** 2033-I NW

System 6 (1983): Part M93 Part System area bushland, only bushland described

Other Names: not known

Area (ha): total 42.5 (includes open water); bushland 34.5

Local Authorities (Suburb)

City of Cockburn (Bibra Lake)

Zoning

MRS: Parks and Recreation, Important Regional Roads

TPS: Landscape

Ownership Categories

State Government, Local Government

Lot/Location/Reserve numbers (Purpose),

Street name

0, 304 North Lake Rd; 21 Forrest Rd

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Bassendean Dunes

Bassendean Sands (Qpb: S8)

Spearwood Dunes

Sands derived from Tamala Limestone (Qts: S7)

Wetlands (within the Spearwood/Bassendean Dune interface)

Holocene Swamp Deposits (Qhw: Mps)



VEGETATION AND FLORA

Vegetation Complexes

Bassendean Dunes

Bassendean Complex — Central and South (at interface of Bassendean Complex — Central and South and Karrakatta Complex — Central and South)

Spearwood Dunes

Karrakatta Complex — Central and South (interface)

Wetlands

Herdsmen Complex

Floristic Community Types: *not sampled, types inferred

Supergroup 2: Seasonal Wetlands

*11 Wet forests and woodlands

*12 *Melaleuca teretifolia* and/or *Astartea* aff. *fascicularis* shrublands

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau AND/OR

Supergroup 4: Uplands centred on Spearwood and Quindalup Dunes

WETLANDS

Wetland Types: sumpland

Natural Wetland Groups

Spearwood—Bassendean interface

Bibra (S/B.1)

Wetland Management Objectives: Resource Enhancement

Swan Coastal Plain Lakes EPP: 22.2 ha

THREATENED ECOLOGICAL COMMUNITIES

Not assessed

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: open water, vegetated wetland, vegetated uplands

Vegetation and Flora: limited survey (EPA and WAWA 1990, Keighery, BJ, 1996a, Newman 1976, Weston 1993)

Structural Units: mapping (EPA and WAWA 1990, Newman 1976)

Uplands: *Eucalyptus marginata* and *E. calophylla* Open Forest; *Banksia attenuata* and *B. menziesii* Low Open Forest, with *Eucalyptus marginata*

Wetlands: *Eucalyptus rudis* Low Closed Forest; *Eucalyptus rudis* and *Melaleuca preissiana* Open Forest, with *Acacia saligna* and *Melaleuca teretifolia* Tall Scrub; *Melaleuca* sp. Low Open Forest to Low Woodland; *Acacia saligna* Low Woodland; Mixed Closed Sedgeland

Scattered Native Plants: not assessed

Vegetation Condition: >50% Good to Very Good, with areas of severe localised disturbance (mapping, Weston 1993)

Total Flora: not known

Significant Flora: none recorded

Fauna: no known information

Linkage: no adjacent bushland; part of proposed Greenway 103 (Tingay, Alan & Associates 1997a); part of a regionally significant contiguous bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: included in Beelihar Regional Park Proposal (DPUD 1992a)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Interim list of the Register of the National Estate

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, 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 Coastal Plain Lakes EPP; under MRS Parks and Recreation Reservation and TPS Landscape Zoning

Constraints: under MRD regional road requirements

Recommendation: The care, control and management of this Bushplan Site for conservation purposes within Beelihar Regional Park is endorsed.

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: open water, vegetated wetland, vegetated uplands

Vegetation and Flora: detailed survey (Ecoscape 1994b); limited survey (EPA and WAWA 1990, Keighery, BJ, 1996a, Murdoch University 1988, Newman 1976, Weston 1993; part Bushplan Site (Reserve 11) (Semeniuk, V&C 1997a)

Structural Units: mapping (Ecoscape 1994b, EPA and WAWA 1990, Murdoch University 1988, Newman 1976)

Uplands: *Eucalyptus gomphocephala*, *E. marginata* and *E. calophylla* Woodland; *Eucalyptus marginata* Woodland; *Banksia attenuata* and *B. menziesii* Low Woodland with *Eucalyptus marginata*

Wetlands: *Eucalyptus rudis* Open Forest; *Melaleuca raphiophylla* and *Eucalyptus rudis* Woodland; *Melaleuca preissiana* and *Banksia ilicifolia* Low Woodland; *Melaleuca teretifolia* Low Woodland to Tall Open Scrub; *Acacia saligna* Tall Shrubland; Sedgeland to Closed Sedgeland dominated by *Baumea articulata* or **Typha orientalis*

Scattered Native Plants: not assessed

Vegetation Condition: <20% Excellent to Very Good, >80% Good to Completely Degraded, with areas of severe localised disturbance (mapping, Ecoscape 1994b, Weston 1993)

Total Flora: 140 natives, 68 weeds (Ecoscape 1994b), part Bushplan Site (Reserve 11) - Semeniuk, V&C 1997a (estimated >80% expected native flora)

Significant Flora: Weston 1993 — *Dodonaea hackettiana* (4) (Little Rush Lake)

Fauna: multiple surveys by RAOU (1996 D) for birds (93) and limited survey by Murdoch University (1988) for native mammals (3), reptiles (21) and amphibians (6). Important permanent waterbody for feeding and wetland area for breeding. Counts of Pink-eared ducks and Blue-billed ducks represent the second highest numbers of these species for 300 wetlands in south western Australia. Significant bird species: category 1 (1), category 2 (8), category 3 (15) and category 4 (6). Significant mammal species: Quenda (Friend 1996 D)

Linkage: adjacent bushland to the south (BS391) and west; part of proposed Greenways 103, 96 (Tingay, Alan & Associates 1997a); part of a regionally significant contiguous bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: included in Beeliar Regional Park Proposal (DPUD 1992a)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Interim List of the Register of the National Estate; Location for JAMBA/CAMBA species

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Rarity, 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 Coastal Plain Lakes EPP; location of Scheduled Fauna, conservation category wetlands; under MRS Parks and Recreation Reservation and TPS Parks and Recreation Zoning and Landscape Zoning, Crown Reserve

Constraints: private land; under MRS Urban Zoning

Recommendation: The care, control and management of this Bushplan Site for conservation purposes within Beeliar Regional Park is endorsed.

THOMSONS LAKE NATURE RESERVE AND ADJACENT BUSHLAND, BEELIAR

Boundary Definition: protected area boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 391 Map no. 74 Map sheet series ref. no. 2033-I SW

System 6 (1983): Part M93 Part System area bushland, only bushland described

Other Names

Part Submission Area 18

Local Authorities (Suburb)

City of Cockburn (Success)

Area (ha): total 744.0 (includes open water); bushland 366.7

Zoning

MRS: Parks and Recreation, Urban, Urban Deferred, Rural, Important Regional Roads

TPS: Local Road, R.O.W., P.A.W., Rural, Landscape



Ownership Categories

State Government, Private (including commercial organisation), Local Government, Not identified

Lot/Location/Reserve numbers (Purpose), Street name

2726 Lorimer Rd; 1, 755, 764, 2253, 2726 Wedge Rd; 760 Gadd St; 751, 752, 753, 754, 4107, 4360, 4361, 4362, 4363 Senecio L; 51, 433, 677, 777 Hammond Rd; 9 Yangebup Rd; 764, 765, 766, 768, 769, 770, 771, 2252, 2253, 2254, 2256 Branch Cres; Drain; 303, 2253, 2725, 4267 street not identified

Crown Reserve

CALM Managed Land

Reserve 15556 (Fauna Conservation and Research and Drainage)

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Bassendean Dunes

Bassendean Sands (Qpb: S8)

Bassendean Dunes/Pinjarra Plain

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

Spearwood Dunes

Sands derived from Tamala Limestone (Qts: S7)

Wetlands (within the Spearwood/Bassendean Dune interface)

Holocene Swamp Deposits (Qhw: Cps, Ms5)

VEGETATION AND FLORA

Vegetation Complexes

Bassendean Dunes

Bassendean Complex — Central and South (at or near interface of Bassendean Complex — Central and South and

Karrakatta Complex — Central and South)

Spearwood Dunes

Karrakatta Complex — Central and South

Cottesloe Complex — Central and South

Wetlands

Herdsmen Complex

Floristic Community Types: *not sampled, types inferred

Supergroup 2: Seasonal Wetlands

*11 Wet forests and woodlands

*12 *Melaleuca teretifolia* and/or *Astartea* aff. *fascicularis* shrublands

Supergroup 4: Uplands centred on Spearwood and Quindalup Dunes

24 Northern Spearwood shrublands and woodlands

*28 Spearwood *Banksia attenuata* or *B. attenuata* — *Eucalyptus* woodlands

WETLANDS

Wetland Types: lake, dampland, sumpland, creek, artificial channel

Natural Wetland Groups

Bassendean Dunes

Jandakot (B.3)

Spearwood—Bassendean interface

Bibra (S/B.1)

Wetland Management Objectives: Conservation (367.4ha), Resource Enhancement, Multiple Use

Swan Coastal Plain Lakes EPP: 33.0ha + 13.9ha + 237.3ha = 284.2ha (total)

THREATENED ECOLOGICAL COMMUNITIES

Not assessed

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: open water, vegetated wetland, vegetated uplands

Vegetation and Flora: limited survey (Crook and Evans 1981, EPA and WAWA 1990, Gibson *et al.* 1994 (Thom 01–02), Newman 1976, Weston 1993)

Structural Units: mapping (Crook and Evans 1981, EPA and WAWA 1990, Newman 1976)

Uplands: *Eucalyptus marginata* Low Open Forest; *Banksia attenuata* and *B. menziesii* Low Open Forest and Low Woodland with *Eucalyptus marginata* and *E. todtiana*; mixed Low Heath

Wetlands: *Eucalyptus rudis*, *Melaleuca preissiana* and *M. raphiophylla* Open Forests to Low Woodland; *Eucalyptus todtiana* and *Melaleuca preissiana* Low Open Forest to Low Woodland; *Acacia* sp. Closed to Open Tall Scrub; *Melaleuca teretifolia* Low Open Forest; *Baumea articulata* and *Typha* sp. Closed Sedgeland

Scattered Native Plants: not assessed



Vegetation Condition: >30% Excellent, >50% Very Good to Good, <20% Degraded, with areas of severe localised disturbance

Total Flora: 199 native taxa (Crook and Evans 1981) (estimated > 80% expected taxa)

Significant Flora: *Dodonaea hackettiana* (4); *Lysinema elegans*

Fauna: surveyed by RAOU (1996 D), 23 visits, for birds (105). Important feeding area for large assemblage and population levels of trans-equatorial wading birds protected under the JAMBA/CAMBA treaties. Significant populations of Australasian Shoveler, Hardhead, Blue-billed, Musk, and Pink-eared ducks. Significant bird species: category 1 (2), category 2 (10), category 3 (17) and category 4 (7). Significant mammal species: Quenda (Friend 1996 D)

Linkage: adjacent bushland to the north (BS256, across road), south (BS392, across road), east and west; part of proposed Greenways 91, 103, 93 (Tingay, Alan & Associates 1997a); part of a regionally significant contiguous bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: included in Beeliar Regional Park Proposal (DPUD 1992)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Wetlands of International Importance (RAMSAR); Directory of Important Wetlands in Australia; Interim List of the Register of the National Estate; Location for JAMBA/CAMBA species

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Diversity, 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

Opportunities and/or Constraints

Opportunities: Bushplan Site/part Bushplan Site subject to Swan Coastal Plain Lakes EPP; location of Scheduled Fauna, conservation category wetlands; under MRS Parks and Recreation Reservation and TPS Landscape Zoning, Crown Reserve

Constraints: private land; under MRS Urban Zoning and Urban Deferred Zoning, MRD regional road requirements

Recommendation: The care, control and management of this Bushplan Site (Reserve 15556) for conservation purposes within Beeliar Regional Park is endorsed.

HARRY WARING MARSUPIAL RESERVE, WATTLEUP

Boundary Definition: protected area boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 392 **Map no.** 74 **Map sheet series ref. no.** 2033-I SW

System 6 (1983): Part M93 All System area bushland, total area described

Other Names

Banganup Lake

Local Authorities (Suburb)

City of Cockburn (Wattleup)

Area (ha): total 280.1 (includes open water); bushland 271.6

Zoning

MRS: Parks and Recreation, Parks and Recreation Restricted

TPS: Landscape

Ownership Categories

State Government

Lot/Location/Reserve numbers (Purpose), Street name

2130 Frankland Ave; 2017 Pearse Rd

Crown Reserve

CALM Managed Land

Nature Reserve 29241 (Research and Conservation of Flora and Fauna)

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Bassendean Dunes

Bassendean Sands (Qpb: S8)

Spearwood Dunes

Sands derived from Tamala Limestone (Qts: S7)

Wetlands (within the Spearwood Dunes)

Holocene Swamp Deposits (Qhw: Cps, Ms5)



VEGETATION AND FLORA

Vegetation Complexes

Bassendean Dunes

Bassendean Complex — Central and South (at interface of Bassendean Complex — Central and South and Karrakatta Complex — Central and South)

Spearwood Dunes

Karrakatta Complex — Central and South

Wetlands

Herdsman Complex

Floristic Community Types

Supergroup 2: Seasonal Wetlands

5 Mixed shrub damplands

11 Wet forests and woodlands

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau

21a Central *Banksia attenuata* — *Eucalyptus marginata* woodlands

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

Supergroup 4: Uplands centred on Spearwood and Quindalup Dunes

28 Spearwood *Banksia attenuata* or *B. attenuata* — *Eucalyptus* woodlands

WETLANDS

Wetland Types: sumpland, dampland

Natural Wetland Groups

Bassendean Dunes

Jandakot (B.3)

Spearwood—Bassendean interface

Bibra (S/B.1)

Wetland Management Objectives: Conservation (53.8ha)

Swan Coastal Plain Lakes EPP: 34.4ha

THREATENED ECOLOGICAL COMMUNITIES

Not assessed

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: open water, vegetated wetland, vegetated uplands

Vegetation and Flora: detailed survey (Clay 1980, Weston and Clay 1980); limited survey (EPA and WAWA 1990, Gibson *et al.* 1994 (Harry 01–06), Weston 1993)

Structural Units: mapping (Clay 1980, EPA and WAWA 1990)

Uplands — Bassendean and Spearwood Dunes not distinguished: *Eucalyptus marginata* Open Woodland; *Banksia attenuata* and *B. menziesii* Low Open Woodland to Low Closed Forest

Wetlands: *Eucalyptus rudis*, *Melaleuca preissiana* and *Banksia littoralis* Low Woodland to Low Closed Forest; *Banksia attenuata* and *B. ilicifolia* Low Woodland; *Baumea articulata* Sedgeland to Closed Sedgeland

Scattered Native Plants: *Melaleuca* Low Woodland (EPA and WAWA 1990)

Vegetation Condition: >70% Excellent to Very Good, 30% Good to Degraded (Weston 1993)

Total Flora: 282 native species (Weston and Clay 1980) (estimated >75% expected flora)

Significant Flora: *Aotus cordifolia* (3), *Dodonaea hackettiana* (4); *Boronia crenulata* (Weston and Clay 1980)

Fauna: no systematic survey. Significant mammal species: Quenda (Friend 1996 D)

Linkage: adjacent bushland to the north (BS391 across road), south (BS393), east and west; part of proposed Greenways 93, 91 (Tingay, Alan & Associates 1997a); part of a regionally significant contiguous bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: included in Beeliar Regional Park Proposal (DPUD 1992a); at interface of Bassendean and Spearwood Dunes

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Interim List of the Register of the National Estate

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, Criteria not relevant to determination of conservation value, but which may be applied when evaluating areas having similar values

Opportunities and/or Constraints

Opportunities: Bushplan Site/part Bushplan Site subject to Swan Coastal Plain Lakes EPP; location of conservation category wetlands; under MRS Parks and Recreation Reservation and Parks and Recreation Restricted Zoning and TPS Landscape Zoning, Crown Reserve

Constraints: under General Mineral Resource Area (limestone)



Recommendation: The care, control and management of this area (Reserve 29241) for conservation purposes within Beeliar Regional Park is endorsed.

WATTLEUP LAKE AND ADJACENT BUSHLAND, WATTLEUP/MANDOGALUP

Boundary Definition: bushland (part taken to cadastre)/conservation wetland boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 393 **Map no.** 74 **Map sheet series ref. no.** 2033-I SW

System 6 (1983): Part M93 Part System area bushland and part scattered native plants (canopy), all vegetation described

Other Names

Sayer Rd Swamp, Submission Area 225

Local Authorities (Suburb)

Town of Kwinana (Mandogalup), City of Cockburn (Wattleup)

Area (ha): total 22.2 (includes open water); bushland 18.9

Zoning

MRS: Rural

TPS: Lakes and Drainage, Local Road, R.O.W., P.A.W., Rural, Rural A

Lot/Location/Reserve numbers (Purpose), Street name

3, 500 Mandogalup Rd; 59, 63, 64, 86 Wattleup Rd; 57, 58 Pearse Rd

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Spearwood Dunes

Sands derived from Tamala Limestone (Qts: S7) (at or near interface of Spearwood and Bassendean Dunes)

Wetlands (within the Spearwood/Bassendean Dunes interface)

Holocene Swamp Deposits (Qhw: Cps, Ms5)

VEGETATION AND FLORA

Vegetation Complexes

Bassendean Dunes

Bassendean Complex — Central and South (at interface of Bassendean Complex — Central and South and Karrakatta Complex — Central and South)

Spearwood Dunes

Karrakatta Complex — Central and South

Floristic Community Types: *not sampled types inferred

Supergroup 2: Seasonal Wetlands

*11 Wet forests and woodlands

*12 *Melaleuca teretifolia* and/or *Astartea* aff. *fascicularis* shrubland uplands

WETLANDS

Wetland Types: sumpland, lake

Natural Wetland Groups

Spearwood—Bassendean interface

Bibra (S/B.1)

Wetland Management Objectives: Conservation (2.3ha), Resource Enhancement

Swan Coastal Plain Lakes EPP: 3ha + 9.3ha = 12.3ha (total)

THREATENED ECOLOGICAL COMMUNITIES

Not assessed

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: open water, vegetated wetland, vegetated uplands

Vegetation and Flora: limited survey (Cockburn Wetlands Committee 1976, DEP 1998 fenceline survey, EPA and WAWA 1990, Weston 1993)

Structural Units: mapping (Cockburn Wetlands Committee 1976, EPA and WAWA 1990)

Uplands - Bassendean and Spearwood Dunes not distinguished: *Eucalyptus gomphocephala*, *E. calophylla* and *E. marginata* Open Woodland over mixed *Banksia* species

Wetlands: *Eucalyptus rudis* Low Woodland; *Melaleuca rhapsiophylla* Low Open Forest to Low Forest; *Melaleuca preissiana* and *M. rhapsiophylla* Low Closed Forest; *Melaleuca teretifolia* Closed Tall Scrub; *Baumea articulata* Closed Sedgeland

Scattered Native Plants: *Eucalyptus gomphocephala* Open Woodland; *Melaleuca preissiana* Low Open Woodland; *Eucalyptus rudis* Open Woodland

Vegetation Condition: Part of Bushplan Site only (adjacent to Wattleup Lake) >25% Good, <75% Degraded to Completely Degraded (Weston 1993)

Total Flora: 17 native species (Cockburn Wetlands Committee 1976) (estimated <60% expected flora)

Significant Flora: none recorded

Fauna: no known information

Linkage: adjacent bushland to the north (BS392) and south; part of a regionally significant contiguous bushland/wetland linkage (Volume 2A, Map 8)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Interim List of the Register of the National Estate

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, 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 Coastal Plain Lakes EPP; location of conservation category wetlands; under Planning Control Area No. 39

Constraints: private land

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s).

KEN HURST PARK, LEEMING

Boundary Definition: bushland (part taken to zoning) boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 245 **Map no.** 68 **Map sheet series ref. no.** 2033-I NE

Other Names

Area (ha): total 58.6; bushland 52.7

Submission Area 17

Local Authorities (Suburb)

Zoning

City of Melville (Leeming), City of Cockburn (Jandakot)

MRS: Rural, Railways, Controlled Access Highways

TPS: Landscape, Rural

Ownership Categories

Lot/Location/Reserve numbers (Purpose),

State Government, Local Government

Street name

0 Dundee St; 3 Clifton Rd; 0 Johnston Rd

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Bassendean Dunes

Bassendean Sands (Qpb: S8)

Bassendean Dunes/Pinjarra Plain

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

VEGETATION AND FLORA

Vegetation Complexes

Bassendean Dunes

Bassendean Complex — Central and South

Floristic Community Types: *not sampled, types inferred

Supergroup 2: Seasonal Wetlands

*5 Mixed shrub damplands

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau

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

WETLANDS

Wetland Types: dampland

Natural Wetland Groups

Bassendean Dunes

Jandakot (B.3)

Wetland Management Objectives: Resource Enhancement

Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Not assessed

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated wetland, vegetated uplands

Vegetation and Flora: detailed survey (Murdoch Branch Wildflower Society of WA 1992); limited survey (Gibson *et al.* 1994 (Hurst 01-04))

Structural Units: mapping (Murdoch Branch Wildflower Society of WA 1992)

Uplands: *Banksia attenuata*, *B. menziesii* and *Allocasuarina fraseriana* Low Open Forest to Low Woodland with scattered *Eucalyptus tottiana*; *Banksia attenuata*, *B. menziesii* and *Allocasuarina fraseriana* Low Open Forest to Low Open Woodland with scattered *Nuytsia floribunda* and *Banksia ilicifolia*

Wetlands: *Banksia attenuata* and *B. ilicifolia* Low Open Forest to Low Woodland; *Regelia inops* Open Heath; *Melaleuca preissiana* Low Woodland with *Banksia littoralis* sometimes a co-dominant

Vegetation Condition: >90% Excellent to Very Good, <10% Good to Degraded

Total Flora: 214 native taxa (Murdoch Branch Wildflower Society of WA 1992) (estimated >85% expected flora)

Significant Flora: *Caladenia huegelii* (R); Murdoch Branch Wildflower Society of WA (1992) — *Lysinema elegans*, *Stylidium preissii* (only known record on Swan Coastal Plain), *Stylidium squamellosum* (unusual in the PMR), *Drosera zonaria*

Fauna: structured survey by Dell and Cooper (1995) for birds (33), native mammals (3), reptiles (17) and amphibians (4). Significant mammal species: Quenda and Western Brush Wallaby. Significant bird species: category 1 (1), category 3 (3) and category 4 (4)

Linkage: adjacent bushland to the north and south (BS388); part of a regionally significant fragmented bushland/wetland linkage (Volume 2A, Map 8)

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 and Scheduled Fauna; under TPS Landscape Zoning

Constraints: under MRD regional road requirements, General Mineral Resource Area (sand)

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s). This may include — 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.

JANDAKOT AIRPORT, JANDAKOT

Boundary Definition: bushland taken to cadastre boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 388 **Map no.** 67, 68 **Map sheet series ref. no.** 2033-I NE, 2033-I NW

System 6 (1983): M94 area of bushland goes beyond System area boundaries, all bushland described

Other Names

Part Submission Area 13

Local Authorities (Suburb)

City of Cockburn (Jandakot), City of Canning (Canning Vale)

Area (ha): total 649.7; bushland 410.9

Zoning

MRS: Public Purposes-Commonwealth Government, Rural, Rural-Water Protection, Railways, Public Purposes-Special Uses, Important Regional Roads

TPS: Landscape, Local Park and Recreation Area, Public Purposes

Ownership Categories

Commonwealth Government, Local Government, Private (commercial organisation)

Lot/Location/Reserve numbers (Purpose), Street name

0, 1, 3, 4, 5, 6, 7, 8, 9, 10, 588 Hope Rd; 2 Roe Hwy; 74, 500 Johnston Rd; 77 Jandakot Rd
Crown Reserve

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Bassendean Dunes

Bassendean Sands (Qpb: S8)

Bassendean Dunes/Pinjarra Plain

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

Wetlands (within the Bassendean Dunes/Pinjarra Plain)

Holocene Swamp Deposits (Qhw: Cps) (Qrw: Sp1)

VEGETATION AND FLORA

Vegetation Complexes

Bassendean Dunes

Bassendean Complex — Central and South

Floristic Community Types

Supergroup 2: Seasonal Wetlands

5 Mixed shrub damplands

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau

21c Low lying *Banksia attenuata* woodlands or shrublands

22 *Banksia ilicifolia* woodlands

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

WETLANDS

Wetland Types: dampland

Natural Wetland Groups

Bassendean — Pinjarra transition OR Bassendean with fluvial features

Bennet Brook (B/P.4)

Bassendean Dunes

Jandakot (B.3)

Wetland Management Objectives: Resource Enhancement

Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Not assessed

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated wetland, vegetated uplands

Vegetation and Flora: detailed survey (Dames and Moore 1993, Martinick 1989); limited survey (DEP 1996 (Jand 01-08))

Structural Units: mapping (Dames and Moore 1993, Martinick 1989)

Uplands: scattered *Eucalyptus marginata* over *Banksia attenuata*, *B. menziesii*, *Allocasuarina fraseriana* and *Eucalyptus tottiana* Low Woodland; *Banksia attenuata*, *B. menziesii* and *Nuytsia floribunda* Low Woodland; *Banksia attenuata* and *B. menziesii* Low Woodland

Wetlands: *Eucalyptus rudis* Forest to Woodland; *Melaleuca preissiana* Low Woodland; scattered *Melaleuca preissiana* over *Banksia attenuata* and *B. ilicifolia* Low Open Forest; *Pericalymma ellipticum* Open Low Heath

Vegetation Condition: >85% Excellent to Very Good, <15 % Very Good to Good

Total Flora: 149 native taxa (DEP 1996, Martinick 1989) (estimated <50% expected flora)

Significant Flora: *Leucopogon kingianus*, *Lysinema elegans* (significant population), *Astroloma xerophyllum*, *Hensmania turbinata*

Fauna: multiple and structured surveys by Western Australian Museum of Natural Science (How *et al.* 1996) and Dames and Moore (1993) for birds (56), native mammals (5), reptiles (19) and amphibians (4). Significant populations of Splendid Fairy-wren, Grey Shrike-thrush. Significant bird species: category 1 (1), category 3 (9) and category 4 (7). Significant mammal species: Honey Possum, Quenda and Western Brush Wallaby. Significant reptile species: skink lizards (*Lerista lineata* and *Acritoscincus trilineatum*) and Black-headed Snake (*Rhinoplocephalus gouldii*)

Linkage: adjacent bushland to the north (BS245, across road), east (BS389), south and west; part of proposed Greenway 105 (Tingay, Alan & Associates 1997a); part of fragmented and potential bushland/wetland linkages (Volume 2A, Map 8)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Interim List of the Register of the National Estate

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 Scheduled Fauna; under TPS Landscape Zoning and Local Park and Recreation Area Zoning, Crown Reserve

Constraints: under MRD regional road requirements, Priority and General Mineral Resource Area (sand); requirements for domestic airport



Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owners. This may include parts for which: The conservation values of the Bushplan Site to be protected through one or more of a range of complementary mechanisms to encourage and secure conservation management on private lands; The specific approach to be determined in consultation/negotiation with the land owner(s), but will generally include conservation covenants/management agreements.

ACOURT ROAD BUSHLAND, BANJUP

Boundary Definition: protected area/bushland taken to cadastre and zoning boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 389 **Map no.** 68 **Map sheet series ref. no.** 2033-I NE

Other Names

Part Submission Area 13

Local Authorities (Suburb)

City of Canning (Canning Vale), City of Cockburn (Banjup, Jandakot)

Area (ha): total 305.9; bushland 295.2

Zoning

MRS: Rural, Parks and Recreation

TPS: Local Road, R.O.W., P.A.W., Rural, Special Rural

Ownership Categories

Private (commercial organisation), State Government

Lot/Location/Reserve numbers (Purpose),

Street name

125, 130, 437 Fraser Rd; 5 Acourt Rd; 600, 707 street not identified

Crown Reserve

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Bassendean Dunes

Bassendean Sands (Qpb: S8)

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

Wetlands (within the Bassendean Dunes)

Holocene Swamp Deposits (Qrw: Sp1, Sp2)

VEGETATION AND FLORA

Vegetation Complexes

Bassendean Dunes

Bassendean Complex — Central and South

Floristic Community Types: *not sampled, type inferred

Supergroup 2: Seasonal Wetlands

*5 Mixed shrub damplands

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau

*21c Low lying *Banksia attenuata* woodlands or shrublands

*22 *Banksia ilicifolia* woodlands

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

WETLANDS

Wetland Types: dampland

Natural Wetland Groups

Bassendean—Pinjarra transition OR Bassendean with fluvial features

Bennett Brook (B/P.4)

Bassendean Dunes

Jandakot (B.3)

Wetland Management Objectives: Conservation (124.3ha), Resource Enhancement

Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Not assessed

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated wetland, vegetated uplands

Vegetation and Flora: detailed survey (part Bushplan Site — Goble-Garratt 1993); limited survey (part Bushplan Site — Trudgen 1990)



Structural Units: mapping (part Bushplan Site — Goble-Garratt 1993, Trudgen 1990)

Uplands: *Banksia attenuata*, *B. menziesii* and *B. ilicifolia* Low Woodland; *Banksia attenuata* and *B. menziesii* Low Woodland; *Eucalyptus marginata*, *Allocasuarina fraseriana*, *Banksia attenuata*, *B. menziesii* and *B. ilicifolia* Woodland

Wetlands: *Eucalyptus rudis* and *Melaleuca preissiana* Woodland; mixed Open Low Heath; *Melaleuca teretifolia* Shrubland; *Pericalymma ellipticum* Open Heath; *Regelia ciliata* and *Melaleuca lateritia* Shrubland; *Melaleuca raphiophylla* and *Kunzea ericifolia* Tall Open Scrub

Vegetation Condition: >80% Excellent to Very Good, <20% Good to Completely Degraded (part Bushplan Site — Goble-Garratt 1993, Trudgen 1990)

Total Flora: 117 native taxa (part Bushplan Site — Goble-Garratt 1993) (estimated >50% expected flora)

Significant Flora: *Tripterococcus paniculatus* ms (1)

Fauna: limited survey by Wood and Grieve (1994) for native mammals (2). Significant species: Quenda

Linkage: adjacent bushland to the north, south (BS390), east (BS472, across road) and west (BS388); part of proposed Greenway 105 (Tingay, Alan & Associates 1997a); part of a regionally significant fragmented bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: majority included in Jandakot Botanic Park Proposal (MfP 1995)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Diversity, Rarity, Maintaining ecological processes or natural systems, 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 conservation category wetland; under MRS Parks and Recreation Reservation, Crown Reserve

Constraints: private land; under General and Priority Mineral Resource Area (sand), mining tenement (NLG Sand Supplies) for sand

Recommendation: The care, control and management of this Bushplan Site for conservation purposes within Beeliar Regional Park is endorsed.

GOSNELLS GOLF COURSE BUSHLAND, CANNING VALE

Boundary Definition: bushland taken to cadastre boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 467 **Map no.** 68 **Map sheet series ref. no.** 2033-I NE

Other Names **Area (ha):** total 7.5; bushland 7.3

Gosnells remnant bushland area 1 (Trudgen and Keighery 1995)

Local Authorities (Suburb)
City of Canning (Canning Vale)

Zoning
MRS: Urban, Private Recreation
TPS: Landscape, Rural
Lot/Location/Reserve numbers (Purpose),
Street name
590 Campbell Rd
Crown Reserve

Ownership Categories
Local Government

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

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: *not sampled, types inferred

Supergroup 2: Seasonal Wetlands

*4 *Melaleuca preissiana* damplands

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau

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

WETLANDS

Wetland Types: dampland

Natural Wetland Groups

Bassendean—Pinjarra transition OR Bassendean with fluvial features

Bennet Brook (B/P.4)

Wetland Management Objectives: Resource Enhancement

Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Not assessed

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated wetland, vegetated uplands

Vegetation and Flora: limited survey (Trudgen and Keighery 1995)

Structural Units: mapping (Trudgen and Keighery 1995)

Uplands: Low Open Woodlands to Low Open Forest dominated by combinations of *Banksia attenuata*, *B. menziesii*, *B. ilicifolia*, *Allocasuarina fraseriana* and *Eucalyptus todtiana*

Wetlands: *Melaleuca preissiana*, *Allocasuarina fraseriana* and *Eucalyptus marginata* Low Open Woodland

Vegetation Condition: Very Good to Excellent (Trudgen and Keighery 1995)

Total Flora: not known

Significant Flora: none recorded

Fauna: no systematic survey. Significant mammal species: Quenda (Friend 1996 D)

Linkage: no adjacent bushland

Other Special Attributes: majority Bushplan Site in Middle Canning Catchment Study — 'hydrological modelling assumes no urban development in this area' (Evangelisti & Associates *et al.* 1995)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Rarity, 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; under TPS Landscape Zoning, Crown Reserve

Constraints: under MRS Urban Zoning, General Mineral Resource Area (sand)

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s). This may include — 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.

CANNING VALE PRISON BUSHLAND

Boundary Definition: bushland (part taken to cadastre)/bushland group boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 472

Map no. 68

Map sheet series ref. no. 2033-I NE

Other Names: not known

Area (ha): total 52.7; bushland 49.2

Local Authorities (Suburb)

Zoning

City of Canning (Canning Vale)

MRS: Urban, Parks and Recreation, Important Regional Roads, Public Purposes-Prison

TPS: Landscape

Ownership Categories

Lot/Location/Reserve numbers (Purpose),

State Government

Street name

479 Campbell Rd

Crown Reserve

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

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: *not sampled, types inferred

Supergroup 2: Seasonal Wetlands

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau

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

WETLANDS

Wetland Types: dampland

Natural Wetland Groups (undefined areas included in boundary)

Bassendean—Pinjarra transition OR Bassendean with fluvial features

Bennet Brook (B/P.4)

Bassendean Dunes

Jandakot (B.3)

Wetland Management Objectives: Conservation (3.4ha)

Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Not assessed

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated wetland, vegetated uplands

Vegetation and Flora: limited survey (DEP 1998, roadside inspection)

Uplands: Low Open Woodlands to Low Open Forest dominated by combinations of *Banksia attenuata*, *B. menziesii*, *B. ilicifolia*, *Allocasuarina fraseriana* and *Eucalyptus tottiana*

Wetlands: possibly *Melaleuca preissiana* Low Open Woodland

Vegetation Condition: Very Good (Connell 1995)

Total Flora: not known

Significant Flora: *Caladenia huegelii* (R)

Fauna: no systematic survey. Significant mammal species: Quenda (Friend 1996 D)

Linkage: adjacent bushland to the north, east (BS253, across road) and west (BS389, across road); part of a regionally significant fragmented bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: majority Bushplan Site Category Two Area Middle Canning Catchment Study (Evangelisti & Associates *et al.* 1995)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Rarity, 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

Opportunities and/or Constraints

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

Constraints: under MRS Urban Zoning, MRD regional road requirements, General Mineral Resource Area (sand)

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s). This may include — 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.

HARRISDALE SWAMP AND ADJACENT BUSHLAND, FORRESTDAL

Boundary Definition: protected area/bushland taken to boundary cadastre (currently subject to Environmental Impact Assessment)

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 253

Map no. 68

Map sheet series ref. no. 2033-I NE



Other Names

Green's Swamp, Submission Area 252, Part Submission Area 13

Local Authorities (Suburb)

City of Armadale (Forrestdale)

Ownership Categories

Private (including commercial organisation), State Government

Area (ha): total 114.7 (includes open water); bushland 102.4

Zoning

MRS: Parks and Recreation, Urban, Important Regional Roads

TPS: Landscape, Rural

Lot/Location/Reserve numbers (Purpose), Street name

4, 5, 6, 388 Wright Rd; 2, 7, 8, 9 Warton Rd; 3 Ranford Rd

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Bassendean Dunes

Bassendean Sands (Qpb: S8)

Bassendean Dunes/Pinjarra Plain

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

Wetlands (Bassendean Dunes)

Holocene Swamp Deposits (Qrw: Sp1, Sp2)

VEGETATION AND FLORA

Vegetation Complexes

Combinations of Bassendean Dunes/Pinjarra Plain/Spearwood Dunes

Southern River Complex

Floristic Community Types: *not sampled, types inferred

Supergroup 2: Seasonal Wetlands

*4 *Melaleuca preissiana* damplands

*5 Mixed shrub damplands

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau

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

WETLANDS

Wetland Types: sumpland, dampland, artificial channel

Natural Wetland Groups

Bassendean—Pinjarra transition OR Bassendean with fluvial features

Bennett Brook (B/P.4)

Bassendean Dunes

Jandakot (B.3)

Wetland Management Objectives: Conservation (28.5ha), Resource Enhancement

Swan Coastal Plain Lakes EPP: 9.2ha

THREATENED ECOLOGICAL COMMUNITIES

Not assessed

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: open water, vegetated wetland, vegetated uplands

Vegetation and Flora: limited survey (Trudgen 1990; part Bushplan Site — DEP 1998)

Structural Units: general mapping (Trudgen 1990)

Uplands: *Banksia attenuata* and *B. menziesii* Low Woodland to Low Open Forest with scattered *Allocasuarina fraseriana*, *Eucalyptus marginata* and *Nuytsia floribunda*; *Banksia menziesii*, *B. ilicifolia* and *Eucalyptus marginata* Low Open Forest; *Banksia ilicifolia*, *B. attenuata* and *Melaleuca preissiana* Low Open Forest

Wetlands: *Melaleuca preissiana* and *M. raphiophylla* Woodland with scattered *Banksia littoralis* and *Eucalyptus rudis*; *Eucalyptus rudis* and *M. raphiophylla* Woodland with scattered *M. preissiana* and *Banksia littoralis*; *Melaleuca preissiana* and *Nuytsia floribunda* Woodland; *Melaleuca preissiana* Low Very Open Woodland; *Kunzea ericifolia* Closed Tall Scrub; *Regelia ciliata* Closed Heath to Closed Tall Scrub; *Pericalymma ellipticum* Closed Heath; *Hypocalymma angustifolium* and *Melaleuca* sp. B; Low Open Heath; *Baumea* and *Leptocarpus* species Sedgeland

Scattered Native Plants: not assessed

Vegetation Condition: >60% Pristine to Very Good, <40% Good to Completely Degraded (Trudgen 1990)

Total Flora: not known

Significant Flora: *Caladenia huegelii* (R); *Astrolooma xerophyllum*, *Blancoa canescens*, *Hensmania turbinata* (poorly conserved south of the river)

Fauna: no systematic survey. Significant mammal species: Quenda (Friend 1996 D)

Linkage: adjacent bushland to the south, east and west (BS472, across road); part of proposed Greenway 104 (Tingay, Alan & Associates 1997a); part of a regionally significant fragmented bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: majority Bushplan Site included in Jandakot Botanic Park Proposal (MFP 1995); 'wetland of special note' (Payne 1993a), Green's Swamp potential breeding place for the Freckled Duck (Payne 1993a); part Bushplan Site Category One Area Middle Canning Catchment Study (Evangelisti & Associates *et al.* 1995)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Diversity, Rarity, 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 Coastal Plain Lakes EPP, Swan and Canning Rivers EPP; location of Declared Rare Flora, conservation category wetlands; under MRS Parks and Recreation Reservation and TPS Landscape Zoning

Constraints: under MRS Urban Zoning, MRD regional road requirements, General Mineral Resource Area (sand)

Recommendation: The care, control and management of parts of this Bushplan Site for conservation purposes within Jandakot Regional Park is endorsed. The most appropriate mechanism for the protection of the remainder of this Bushplan Site be considered through the public comment period in consultation with the land owner(s).

HOLMES STREET BUSHLAND, SOUTHERN RIVER/HUNTINGDALE

Boundary Definition: bushland (part taken to cadastre) boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 125 **Map no.** 69 **Map sheet series ref. no.** 2033-I NE

Other Names

Submission Area 215; part Gosnells remnant bushland area 6 (Trudgen and Keighery 1995)

Local Authorities (Suburb)

City of Gosnells (Southern River, Huntingdale)

Area (ha): total 149.8; bushland 132.5

Zoning

MRS: Urban, Rural, Urban Deferred, Important Regional Roads, Private Recreation, Public Purposes-High School

TPS: Rural, Landscape, Parks and Recreation, Residential A

Ownership Categories

Private (including commercial organisation), Local Government, State Government, Not identified

Lot/Location/Reserve numbers (Purpose), Street name

1, 2, 3, 4, 5, 1586, 1587, 1604, 1605, 1645 Holmes St; 1578 Warton Rd; 0, 1, 1596, 1600, 1601, 1602, 1614, 1646, 1647, 1648 Balfour St; 10, 12, 1585, 1588 Harpenden St; 1592, 1595 Gay St; 1607, 1610 Lakey St; 1603, 1606, 1611, 1612, 1613 Barrett St; Road

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Bassendean Dunes

Bassendean Sands (Qpb: S8)

Bassendean Dunes/Pinjarra Plain

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

Wetlands (within the Bassendean Dunes/Pinjarra Plain)

Holocene Swamp Deposits (Qrw: Sp1, Sp2)

VEGETATION AND FLORA

Vegetation Complexes

Combinations of Bassendean Dunes/Pinjarra Plain

Southern River Complex

Floristic Community Types

Supergroup 2: Seasonal Wetlands

4 *Melaleuca preissiana* damplands

S3 Wet sedgeland on sandy clays (most southerly occurrence)

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau

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



WETLANDS

Wetland Types: sumpland, dampland

Natural Wetland Groups

Bassendean—Pinjarra transition OR Bassendean with fluvial features
Bennett Brook (B/P.4)

Wetland Management Objectives: Conservation (95.8ha), Resource Enhancement

Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Not assessed

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated wetland, vegetated uplands

Vegetation and Flora: limited survey (Trudgen and Keighery 1995 (Gosn 2-5, 12-13); part Bushplan Site DEP 1998)

Structural Units: mapping (Trudgen and Keighery 1995 (Gosn 2-5, 12-13))

Uplands: Low Open Woodlands to Low Closed Forests dominated by combinations of *Banksia attenuata*, *B. menziesii*, *B. ilicifolia* and *Allocasuarina fraseriana*; *Eucalyptus calophylla*, *E. marginata* and *Allocasuarina fraseriana* Woodland to Open Forest; *Banksia attenuata*, *B. menziesii*, *B. ilicifolia*, *Eucalyptus marginata* and *Allocasuarina fraseriana* Low Woodland to Low Open Forest; *Banksia attenuata*, *B. menziesii* and *Eucalyptus todtiana* Low Woodland to Low Open Forest

Wetlands: Low Open Woodlands to Low Woodlands dominated by combinations of *Melaleuca preissiana*, *Eucalyptus todtiana*, *Allocasuarina fraseriana*, *Banksia attenuata* and *Nuytsia floribunda*; *Melaleuca preissiana* Low Open Woodland to Low Open Forest; *Melaleuca rhapsiophylla* Low Open Woodland to Low Open Forest; *Melaleuca incana*, *M. viminea* and *M. rhapsiophylla* Low Open Forest; *Melaleuca rhapsiophylla* and *M. viminea* Low Open Woodland to Open Woodland; *Regelia ciliata* Closed Heath to Closed Tall Scrub; *Pericalymma ellipticum* Closed Heath; *Astartea* sp. Brixton Street and *Regelia ciliata* Shrubland to Open Heath; *Hypocalymma angustifolium* and *Melaleuca* sp. B; Low Open Heath; *Evandra pauciflora* Closed Sedgeland

Scattered Native Plants: not assessed

Vegetation Condition: >80% Excellent (some areas considered Pristine, Trudgen and Keighery 1995), <20% Very Good to Good, with areas of severe localised disturbance

Total Flora: > 200 taxa (estimated, DEP 1997)

Significant Flora: *Diuris purdiei* (R), *Caladenia huegelii* (R), *Acacia lasiocarpa* var. *bracteolata* (1), *Schoenus benthamii* (3); *Astroloma xerophyllum*, *Villarsia violifolia*, *Levenhookia preissii*, *Jacksonia gracilis*, *Blancoa canescens*, *Hensmania turbinata* (Trudgen and Keighery 1995)

Fauna: multiple surveys (Submission no. 169) for birds (61). Significant bird species: category 1 (1), category 3 (11) and category 4 (2). Good assemblage of ducks and waterbirds, including 15 breeding species. Breeding site for Freckled Duck (Payne 1993 b). Significant mammal species: Quenda (Friend 1996 D)

Linkage: adjacent bushland to the north and west; part of proposed Greenway 104 (Tingay, Alan & Associates 1997a); part of a regionally significant fragmented bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: recommended to be protected with the purpose of conservation of nature and recreation compatible with the conservation of nature in study of bushland in the City of Gosnells (Trudgen and Keighery 1995), majority Bushplan Site Category One Area Middle Canning Catchment Study (Evangelisti & Associates *et al.* 1995)

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 and Scheduled Fauna, conservation category wetlands; under TPS Parks and Recreation Zoning and Landscape Zoning

Constraints: private land; under MRS Urban Zoning and Urban Deferred Zoning, MRD regional road requirements

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s). Note that environmental conditions apply to part of Bushplan Site (Lots 1588 and 10 Harpenden St)

BALANNUP LAKE AND ADJACENT BUSHLAND, SOUTHERN RIVER/FORRESTDAL

Boundary Definition: protected area/bushland part taken to cadastre boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 413

Map no. 69

Map sheet series ref. no. 2033-I NE

Other Names

Submission Area 213 and 241; part Gosnells remnant bushland area 17 (Trudgen and Keighery 1995)

Area (ha): total 80.2 (includes open water); bushland 76.6

Local Authorities (Suburb)

City of Gosnells (Southern River), City of Armadale (Forrestdale)

Zoning

MRS: Rural, Parks and Recreation, Important Regional Roads

TPS: Rural, Landscape, General Rural

Ownership Categories

Private (including commercial organisation), State Government, Local Government, Not identified

Lot/Location/Reserve numbers (Purpose),

Street name

1, 1625, 1626, 1627, 1628 Ranford Rd; 1630, 1631, 1632, 1769 Furley Rd; 1771, 1772 Matison St; 1770 Southern River Rd; 506 Balannup Rd

Crown Reserve

Reserve 1821 (Conservation of Flora and Fauna)

CALM Managed Land

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Bassendean Dunes

Bassendean Sands (Qpb: S8)

Bassendean Dunes/Pinjarra Plain

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

Wetlands (within the Bassendean Dunes/Pinjarra Plain)

Holocene Swamp Deposits (Qrw: Sp1, Sp2)

VEGETATION AND FLORA

Vegetation Complexes

Combinations of Bassendean Dunes/Pinjarra Plain

Southern River Complex

Floristic Community Types: *not sampled, types inferred

Supergroup 2: Seasonal Wetlands

*4 *Melaleuca preissiana* damplands

*11 Wet forests and woodlands

*12 *Melaleuca teretifolia* and/or *Astartea* aff. *fascicularis* shrublands

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau

*21c Low lying *Banksia attenuata* woodlands or shrublands

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

WETLANDS

Wetland Types: sumpland, dampland, artificial channel

Natural Wetland Groups

Bassendean—Pinjarra transition OR Bassendean with fluvial features

Bennett Brook (B/P.4)

Wetland Management Objectives: Conservation (32ha), Resource Enhancement

Swan Coastal Plain Lakes EPP: 7.1 ha

THREATENED ECOLOGICAL COMMUNITIES

Not assessed

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: open water, vegetated wetland, vegetated uplands

Vegetation and Flora: limited survey (Submission no. 164b, Trudgen and Keighery 1995)

Structural Units: mapping (Trudgen and Keighery 1995)

Uplands: *Banksia attenuata*, *B. menziesii* and *Nuytsia floribunda* Low Woodland; *Banksia menziesii*, *B. attenuata*, *Allocasuarina fraseriana* and *Eucalyptus tottiana* Low Woodland; *Banksia menziesii*, *B. attenuata*, *Nuytsia floribunda* and *Allocasuarina fraseriana* Low Open Woodland to Low Open Forest; *Banksia menziesii* and *B. ilicifolia* Low Woodland to Low Open Forest; *Banksia attenuata*, *B. menziesii*, *B. ilicifolia* and *Eucalyptus tottiana* Low Open Woodland to Low Woodland; *Eucalyptus tottiana* and *Allocasuarina fraseriana* Low Open Woodland



Wetlands: *Melaleuca preissiana*, *Allocasuarina fraseriana*, *Nuytsia floribunda*, *Eucalyptus marginata* and *E. todtiana* Low Open Woodland; *Allocasuarina fraseriana*, *Melaleuca preissiana*, *Eucalyptus todtiana* and *Nuytsia floribunda* Low Open Woodland to Low Woodland; *Melaleuca preissiana*, *Allocasuarina fraseriana* and *Nuytsia floribunda* Low Open Woodland; *Melaleuca raphiophylla* Low Forest; *Melaleuca teretifolia* Tall Open Scrub; *Melaleuca preissiana* Low Open Woodland; *Pericalymma ellipticum* Open Heath to Closed Heath; *Regelia ciliata* Open Heath; *Juncus pallidus* and *Phalaris* sp. Sedgeland/Grassland

Vegetation Condition: >80% Excellent to Very Good, <20% Good to Degraded, with areas of severe localised disturbance

Total Flora: not known

Significant Flora: *Blancoa canescens*

Fauna: no systematic survey. Significant mammal species: Quenda (Friend 1996 D)

Linkage: adjacent bushland to the north and south (BS342); part of proposed Greenway 142 (Tingay, Alan & Associates 1997a); part of a regionally significant fragmented bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: 'wetland of special note' (Payne 1993a, 1993b); important waterbird habitat (Submission no. 164b), Scopewest site; recommended to be protected with the purpose of conservation of nature and recreation compatible with the conservation of nature in study of bushland in the City of Gosnells (Trudgen and Keighery 1995); Category One Area Middle Canning Catchment Study (Evangelisti & Associates *et al.* 1995); part Bushplan Site included in Jandakot Botanic Park Proposal (MfP 1995)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Rarity, Maintaining ecological systems or natural processes, 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 Coastal Plain Lakes EPP; location of 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 care, control and management of parts of this Bushplan Site for conservation purposes within Jandakot Regional Park is endorsed. The most appropriate mechanism for the protection of the remainder of this Bushplan Site be considered through the public comment period in consultation with the land owner(s).

PHOEBE STREET BUSHLAND, SOUTHERN RIVER

Boundary Definition: bushland (part taken to cadastre) boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 340 **Map no.** 69 **Map sheet series ref. no.** 2033-I NE

Other Names **Area (ha):** total 8.2; bushland 8.2

Part Gosnells remnant bushland area 47 (Trudgen and Keighery 1995)

Local Authorities (Suburb)
City of Gosnells (Southern River)

Zoning
MRS: Urban Deferred, Rural
TPS: Landscape, Rural
Lot/Location/Reserve numbers (Purpose),
Street name
1 Phoebe St; 2, 3, 4, 5 Matison St

Ownership Categories
Private, Not identified

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

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/Spearwood Dunes
Southern River Complex

Floristic Community Types: *not sampled, types inferred (Trudgen and Keighery 1995)

Supergroup 2: Seasonal Wetlands

*4 *Melaleuca preissiana* damplands

*5 Mixed shrub damplands

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau

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

WETLANDS

Wetland Types: dampland

Natural Wetland Groups

Bassendean — Pinjarra transition OR Bassendean with fluvial features

Bennet Brook (B/P.4)

Wetland Management Objectives: Conservation (3.5ha), Resource Enhancement

Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Not assessed

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated wetland, vegetated uplands

Vegetation and Flora: limited survey (Trudgen and Keighery 1995)

Structural Units: mapping (Trudgen and Keighery 1995)

Uplands: *Allocasuarina fraseriana*, *Eucalyptus todtiana* and *Nuytsia floribunda* Low Open Woodland; *Eucalyptus decipiens* Open Mallee Woodland; *Eucalyptus calophylla* Open to Tall Open Woodland; *Xanthorrhoea preissii* and *Eremaea pauciflora* Open Heath; *Adenanthos cygnorum* Tall Open Shrubland to Tall Shrubland

Wetlands: *Melaleuca preissiana* and *Nuytsia floribunda* Low Open Woodland; *Evandra pauciflora* Sedgeland

Vegetation Condition: >50% Excellent to Very Good, <50% Good to Degraded, with areas of severe localised disturbance

Total Flora: not known

Significant Flora: *Jacksonia gracilis*

Fauna: no known information

Linkage: adjacent bushland to the west part of proposed Greenway 142 (Tingay, Alan & Associates 1997a); part of a regionally significant fragmented bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: bushland recommended to be protected with the purpose of conservation of nature and recreation compatible with the conservation of nature in study of bushland in the City of Gosnells (Trudgen and Keighery 1995); majority Bushplan Site Category Two Area Middle Canning Catchment Study (Evangelisti & Associates *et al.* 1995)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Diversity, 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, Swan Coastal Plain Lakes EPP; location of conservation category wetlands; under TPS Landscape Zoning

Constraints: private land; under MRS Urban Deferred Zoning

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s).

MATISON STREET BUSHLAND, SOUTHERN RIVER

Boundary Definition: bushland (part taken to cadastre)/conservation wetland boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 464

Map no. 69

Map sheet series ref. no. 2033-I NE

Other Names

Area (ha): total 41.9; bushland 34.8

Submission Area 216; Gosnells remnant bushland area 19

(Trudgen and Keighery 1995)

Local Authorities (Suburb)

Zoning

City of Gosnells (Southern River)

MRS: Urban Deferred, Important Regional Roads

TPS: Landscape, Rural

Ownership Categories

Lot/Location/Reserve numbers (Purpose),

Private (including commercial organisation)

Street name

1793, 1795, 1796, 1797, 1798 Mation St; 1799, 1800, 1801, 1802 Passmore St; 1803, 1804 Holmes St

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

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/Spearwood Dunes
Southern River Complex

Floristic Community Types: *not sampled, types inferred

Supergroup 2: Seasonal Wetlands

*4 *Melaleuca preissiana* damplands

*5 Mixed shrub damplands

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau

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

WETLANDS

Wetland Types: dampland, creek, artificial channel

Natural Wetland Groups

Bassendean — Pinjarra transition OR Bassendean with fluvial features

Bennet Brook (B/P.4)

Wetland Management Objectives: Conservation (27.5ha, 843m)

Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Not assessed

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated wetland, creek, vegetated uplands

Vegetation and Flora: limited survey (Trudgen and Keighery 1995)

Structural Units: mapping (Trudgen and Keighery 1995)

Uplands: Low Open Forest to Low Open Woodland dominated by *Allocasuarina fraseriana*, *Banksia menziesii*, *B. ilicifolia*, *Nuytsia floribunda* and *Eucalyptus tottiana* and combinations of these; *Xanthorrhoea preissii* and *Eremaea pauciflora* Open Heath; *Adenanthos cygnorum* Tall Open Shrubland to Tall Shrubland

Wetlands: *Eucalyptus calophylla* Open Woodland over *Melaleuca preissiana* Low Open Woodland; *Melaleuca preissiana* Low Open Woodland; *Regelia ciliata* and *Pericalymma ellipticum* Open Heath to Closed Heath

Scattered Native Plants: not assessed

Vegetation Condition: >65% Excellent to Very Good, >30% Good to Degraded, with areas of severe localised disturbance

Total Flora: not known

Significant Flora: Trudgen and Keighery 1995 — *Fimbristylis velata* (uncommon, poorly collected)

Fauna: no known information

Linkage: adjacent bushland/canopy to Southern River; part of proposed Greenway 142 (Tingay, Alan & Associates 1997a); part of a regionally significant fragmented bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: bushland recommended to be protected with the purpose of conservation of nature and recreation compatible with the conservation of nature in study of bushland in the City of Gosnells (Trudgen and Keighery 1995); Bushplan Site Category One Middle Canning Catchment Study (Evangelisti & Associates *et al.* 1995); one of only two large areas of bushland on the Southern River (BS255 and BS464)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria met for inclusion: Representation of ecological communities, Maintaining ecological processes or natural systems, General criteria for the protection of wetland, streamline and estuarine fringing and coastal vegetation

Opportunities and/or Constraints

Opportunities: Bushplan Site/part Bushplan Site location of conservation category wetlands; under TPS Landscape Zoning

Constraints: private land; under MRS Urban Deferred Zoning, MRD regional road requirements

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s).

PASSMORE STREET BUSHLAND, SOUTHERN RIVER

Boundary Definition: bushland taken to cadastre boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 465

Map no. 69

Map sheet series ref. no. 2033-I NE

Other Names

Area (ha): total 15.4; bushland 13.7

Submission Area 216; Gosnells remnant bushland area

46/49 (Trudgen and Keighery 1995)

Local Authorities (Suburb)

City of Gosnells (Southern River)

Zoning

MRS: Rural

TPS: Rural

Lot/Location/Reserve numbers (Purpose),

Street name

2 Furley Rd; 4, 31, 1782 Phoebe St

Ownership Categories

Private

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Bassendean Dunes

Bassendean Sands (Qpb: S8)

Bassendean Dunes/Pinjarra Plain

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

Wetlands (within the Bassendean Dunes/Pinjarra Plain)

Holocene Swamp Deposits (Qrw: Sp1)

VEGETATION AND FLORA

Vegetation Complexes

Combinations of Bassendean Dunes/Pinjarra Plain

Southern River Complex

Floristic Community Types: *not sampled, types inferred

Supergroup 1: Foothills/Pinjarra Plain

*3 *Eucalyptus calophylla* woodlands

Supergroup 2: Seasonal Wetlands

*4 *Melaleuca preissiana* damplands

*5 Mixed shrub damplands

*8 Herb-rich shrublands in clay pans

*15 Forests and woodlands of deep seasonal wetlands

WETLANDS

Wetland Types: dampland

Natural Wetland Groups

Bassendean — Pinjarra transition OR Bassendean with fluvial features

Bennet Brook (B/P.4)

Wetland Management Objectives: Conservation (11.8ha), Resource Enhancement

Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Vulnerable (floristic community types 3, 8 and 15), possible occurrence of Critically Endangered Shrublands and Woodlands on Muchea Limestone communities, the most southern known location of *Eucalyptus decipiens* (an indicator of Muchea Limestone communities) on the eastern side of the Plain in the PMR having been found adjacent to this Site

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated wetland, river, creek, vegetated uplands, possible Muchea Limestones

Vegetation and Flora: limited survey (Trudgen and Keighery 1995)

Structural Units: mapping (Trudgen and Keighery 1995)

Uplands: *Eucalyptus calophylla* Open to Tall Open Woodland

Wetlands: *Melaleuca preissiana* Low Open Woodland often with the co-dominants *Allocasuarina fraseriana*, *Banksia grandis*, *Nuytsia floribunda*; *Jacksonia furcellata*, *Viminaria juncea*, *Nuytsia floribunda* and *Melaleuca preissiana* Low Open Woodland; *Viminaria juncea* Tall Open Shrubland to Low Woodland *Melaleuca* Shrubland to Tall Shrubland dominated by *Melaleuca viminea*, *M. uncinata* and *M. raphiophylla* and combinations of these; *Melaleuca pauciflora* Open Shrubland to Open Heath; *Kunzea recurva* Low Open Shrubland; *Pericalymma ellipticum* Open Shrubland; Sedgeland dominated by *Gahnia trifida*, *Leptocarpus coangustatus* and *Lepidosperma longitudinale* and combinations of these

Scattered Native Plants: not assessed



Vegetation Condition: >65% Excellent to Very Good, >30% Good to Degraded, with areas of severe localised disturbance

Total Flora: not known

Significant Flora: *Rhodanthe pyrethrum* (3), Trudgen and Keighery 1995 — *Acacia benthamii* (2), *Trichocline* sp. Treeton (BJK and NG 564) (2), *Stylidium longitubum* (3), *Anthotium junciforme* (4), *Verticordia lindleyi* subsp. *lindleyi* (4); *Podolepis gracilis* Swamp Form (GJK 13126), *Jacksonia gracilis*

Fauna: no known information

Linkage: adjacent bushland to the south; part of proposed Greenway 142 (Tingay, Alan & Associates 1997a); part of a regionally significant fragmented bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: encompasses five floristic community types; bushland recommended to be protected with the purpose of conservation of nature and recreation compatible with the conservation of nature in study of bushland in the City of Gosnells (Trudgen and Keighery 1995); Bushplan Site Category Two 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 met for inclusion: Representation of ecological communities, Diversity, Rarity, General criteria for the protection of wetland, streamline and estuarine fringing and coastal vegetation

Opportunities and Constraints

Opportunities: Bushplan Site/part Bushplan Site location of conservation category wetlands

Constraints: private land

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s).

TEA TREE CLOSE BUSHLAND, JANDAKOT

Boundary Definition: protected area/bushland group boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 458 **Map no.** 67, 74 **Map sheet series ref. no.** 2033-I NW, 2033-I SW

Other Names: not known

Area (ha): total 44.7 (includes open water); bushland 23.8

Local Authorities (Suburb)

City of Cockburn (Jandakot)

Zoning

MRS: Parks and Recreation Restricted, Important Regional Roads

TPS: Landscape

Ownership Categories

State Government, Private (commercial organisation)

Lot/Location/Reserve numbers (Purpose),

Street name

40, 505 Tea Tree Cl; 0, 10, 227, 228, 231 Forrest Rd; 228 North Lake Rd; 12 Beeliar Dr; 1 Poletti Rd; 0, 27950 street not identified

Crown Reserve

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Bassendean Dunes

Bassendean Sands (Qpb: S8)

Bassendean Dunes/Pinjarra Plain

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

Wetlands (within the Bassendean Dunes/Pinjarra Plain)

Holocene Swamp Deposits (Qhw: Ms5)

VEGETATION AND FLORA

Vegetation Complexes

Bassendean Dunes

Bassendean Complex — Central and South

Floristic Community Types: *not sampled, types inferred

Supergroup 2: Seasonal Wetlands

*4 *Melaleuca preissiana* damplands

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau

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

WETLANDS

Wetland Types: sumpland, dampland

Natural Wetland Groups

Bassendean Dunes

Jandakot (B.3)

Wetland Management Objectives: Resource Enhancement, Multiple Use

Swan Coastal Plain Lakes EPP: 1.9 ha

THREATENED ECOLOGICAL COMMUNITIES

Not assessed

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: open water, vegetated wetland, vegetated uplands

Vegetation and Flora limited survey (DEP 1998)

Structural Units

Uplands: *Eucalyptus tottiana* Low Woodland with occasional *Banksia menziesii*, *B. attenuata* and *Nuytsia floribunda*

Wetlands: *Banksia littoralis* Low Open Woodland, *Melaleuca preissiana* Closed Forest; *Melaleuca ?incana* Closed Tall Scrub

Scattered Native Plants: *Melaleuca preissiana* Low Open Woodland — regionally significant vegetation recognised as being included in the area of Bushplan Site in need of protection

Vegetation Condition: Excellent to Very Good, with areas of severe localised disturbance.

Total Flora: not known

Significant Flora: none recorded

Fauna: no systematic survey. Significant mammal species: Quenda (Friend 1996 D)

Linkage: adjacent bushland to the east and west; part of proposed Greenways 96, 95 (Tingay, Alan & Associates 1997a)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Rarity, 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 Coastal Plain Lakes EPP; under MRS Parks and Recreation Restricted Zoning and TPS Landscape Zoning, Crown Reserve

Constraints: private land; under MRD regional road requirements

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s). (Those parts of the Bushplan Site reserved for Parks and Recreation in the Metropolitan Region Scheme should be made a Crown Reserve with a conservation purpose).

FRASER ROAD BUSHLAND, BANJUP

Boundary Definition: protected area/bushland (part taken to cadastre) boundary (Areas of bushland within the boundaries of the Bushplan Site are not accurately mapped.)

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 390 **Map no.** 68, 74, 75 **Map sheet series ref. no.** 2033-I NE, 2033-I SE, 2033-I SW

Other Names

Part Submission Area 13

Local Authorities (Suburb)

City of Cockburn (Banjup)

Area (ha): total 198.7; bushland 171.7

Zoning

MRS: Rural-Water Protection, Parks and Recreation, Important Regional Roads, Public Purposes-Special Uses

TPS: Landscape, Rural, Local Road, R.O.W., P.A.W.

Lot/Location/Reserve numbers (Purpose),

Street name

2, 4, 136, 140, 594, 614 Armadale Rd; 532 Warton Rd;

131 Fraser Rd

Crown Reserve

Ownership Categories

Private (including commercial organisation), State

Government, Local Government



SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Bassendean Dunes

Bassendean Sands (Qpb: S8)

Bassendean Dunes/Pinjarra Plain

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

VEGETATION AND FLORA

Vegetation Complexes

Bassendean Dunes

Bassendean Complex — Central and South

Combinations of Bassendean Dunes/Pinjarra Plain

Southern River Complex

Floristic Community Types: *not sampled, type inferred

Supergroup 2: Seasonal Wetlands

*4 *Melaleuca preissiana* damplands

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau

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

WETLANDS

Wetland Types: dampland

Natural Wetland Groups

Bassendean Dunes

Jandakot (B.3)

Wetland Management Objectives: Resource Enhancement

Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Not assessed

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated wetland, vegetated uplands

Vegetation and Flora: limited survey — part Bushplan Site (Bowman Bishaw Gorham 1990; Meney 1996; Semeniuk, V&C Research Group 1997a, Trudgen 1990)

Structural Units: mapping — part Bushplan Site (Bowman Bishaw Gorham 1990; Trudgen 1990)

Uplands: *Banksia attenuata* and *B. menziesii* Low Woodland to Low Open Forest with scattered *Allocasuarina fraseriana*; *Eucalyptus marginata*, *E. tottiana* and *Nuytsia floribunda*; *Banksia menziesii*, *B. ilicifolia* and *Eucalyptus marginata* Low Open Forest; *Eucalyptus gomphocephala*, *E. calophylla* and *E. marginata* Woodland with occasional *Banksia attenuata*, *B. menziesii* and *Allocasuarina fraseriana*

Wetlands: Mixed *Melaleuca raphiophylla*, *Eucalyptus rudis* Woodland with occasional *Melaleuca preissiana* and *Banksia littoralis*; *Melaleuca preissiana*, *M. raphiophylla* Woodland with occasional *Eucalyptus rudis* and *Banksia ilicifolia*; *Hypocalymma angustifolium*, *Pericalymma ellipticum* and *Astartea aff. fascicularis* Open Heath to Shrubland; *Baumea* spp. and *Leptocarpus* spp. Sedgeland

Vegetation Condition: >75% Excellent, <25% Very Good to Completely Degraded (Trudgen 1990)

Total Flora: part Bushplan Site — 106 native taxa (Reserve 1820 from Meney 1996 and Semeniuk, V&C Research Group 1997a) (estimated >50% expected flora of the Bushplan Site)

Significant Flora: *Caladenia huegelii* (R)

Fauna: limited survey by MJ and AR Bamford (Meney 1996) for birds (26), mammals (3) and reptiles (5). Significant bird species: category 3 (5) and category 4 (3). Significant mammal species: Quenda (Meney 1996 and Friend 1996 D) and Echidna. Significant reptile species: Rosenberg's Monitor (*Varanus rosenbergii*)

Linkage: adjacent bushland to the north (BS389), south (BS344 over road) east and west; part of proposed Greenway 105 (Tingay, Alan & Associates 1997a); part of a regionally significant fragmented bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: part Bushplan Site included in Jandakot Botanic Park Proposal (MfP 1995); part Bushplan Site Category One Area Middle Canning Catchment Study (Evangelisti & Associates *et al.* 1995)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Rarity, 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; under MRS Parks and Recreation Reservation and TPS Landscape Zoning, Crown Reserve

Constraints: private land; under MRD regional road requirements, General and Priority Mineral Resource Area (sand), mining tenements M70/693 (Homeswest Calcil), M70/357 (Rocla), M70/751 (Peat Resources) and index no. 23/6 (no tenement listed, Boral Casil Ltd)

Recommendation: The care, control and management of parts of this Bushplan Site for conservation purposes within Jandakot Regional Park is endorsed. The most appropriate mechanism for the protection of the remainder of this Bushplan Site be considered through the public comment period in consultation with the land owner(s).

PIARRA NATURE RESERVE, FORRESTDALE

Boundary Definition: protected area boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 262	Map no. 75	Map sheet series ref. no. 2033-I SE
Other Names Part Submission Area 13		Area (ha): total 41.897 (includes open water); bushland 35.823
Local Authorities (Suburb) City of Armadale (Forrestdale)		Zoning MRS: Parks and Recreation TPS: Landscape
Ownership Categories Local Government		Lot/Location/Reserve numbers (Purpose), Street name 606 Mason Rd Crown Reserve Reserve 36594 (Conservation of Flora and Fauna)
CALM Managed Land		

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Bassendean Dunes
Bassendean Sands (Qpb: S8)
Bassendean Dunes/Pinjarra Plain
Bassendean Sands over Guildford Formation (Qpb/Qpa:S10)
Wetlands (within the Bassendean Dunes/Pinjarra Plain)
Holocene Swamp Deposits (Qrw: Sp1, Sp2)

VEGETATION AND FLORA

Vegetation Complexes
Combinations of Bassendean Dunes/Pinjarra Plain
Southern River Complex
Floristic Community Types: *not sampled, types inferred
Supergroup 2: Seasonal Wetlands
*4 *Melaleuca preissiana* damplands
*5 Mixed shrub damplands
*11 Wet forests and woodlands
Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau
*21a Central *Banksia attenuata* — *Eucalyptus marginata* woodlands
*21c Low lying *Banksia attenuata* woodlands or shrublands

WETLANDS

Wetland Types: sumpland, dampland
Natural Wetland Groups
Bassendean—Pinjarra transition OR Bassendean with fluvial features
Bennett Brook (B/P.4)
Bassendean Dunes
Jandakot (B.3)
Wetland Management Objectives: Conservation (14ha), Resource Enhancement
Swan Coastal Plain Lakes EPP: 2.3ha

THREATENED ECOLOGICAL COMMUNITIES

Not assessed

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: open water, vegetated wetland, vegetated uplands
Vegetation and Flora: limited survey (Trudgen 1990, DEP 1998)
Structural Units: general mapping (Trudgen 1990)
Uplands: *Banksia menziesii*, *B. ilicifolia* and *Eucalyptus marginata* Low Open Forest



Wetlands: *Melaleuca raphiophylla* Low Forest to Woodland; *Melaleuca preissiana* and *M. raphiophylla* Woodland with scattered *Banksia littoralis* and *Eucalyptus rudis*; *Eucalyptus rudis* and *Melaleuca raphiophylla* Woodland with scattered *Melaleuca preissiana* and *Banksia littoralis*; Myrtaceous Closed Heaths; *Baumea* and *Leptocarpus* species Sedgeland

Vegetation Condition: >80% Pristine to Very Good, <20% Very Good, with areas of severe localised disturbance (general mapping, Trudgen 1990)

Total Flora: not known

Significant Flora: none recorded

Fauna: no known information, Freckled Duck breeding site

Linkage: adjacent bushland to the north, south and east; part of proposed Greenway 142 (Tingay, Alan & Associates 1997a)

Other Special Attributes: included in Jandakot Botanic Park Proposal (MfP 1995); Category One Area Middle Canning Catchment Study (Evangelisti & Associates *et al.* 1995); 'wetland of special note' (Payne 1993a)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Rarity, 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 Coastal Plain Lakes EPP, Swan and Canning Rivers EPP; location of conservation category wetlands; under MRS Parks and Recreation Reservation, TPS Landscape Zoning, Crown Reserve

Constraints: private land; under General Mineral Resource Area (sand)

Recommendation: The care, control and management of this Bushplan Site (Reserve 36594) for conservation purposes within Jandakot Regional Park is endorsed.

BANJUP BUSHLAND, BANJUP

Boundary Definition: protected area/bushland taken to zoning/cadastre/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. 263 **Map no.** 74, 75 **Map sheet series ref. no.** 2033-I SE, 2033-I SW

Other Names
Part Submission Area 13, includes Buckingham, Bosworth and Emma Treeby Reserves

Area (ha): total 141.2 (includes open water); bushland 103.9

Local Authorities (Suburb)
City of Cockburn (Banjup, Atwell)

Zoning
MRS: Parks and Recreation, Rural-Water Protection
TPS: Lakes and Drainage, Local Road, R.O.W., P.A.W., Parks and Recreation, Public Purposes

Ownership Categories
Private (including commercial organisation), Commonwealth Government, State Government, Local Government

Lot/Location/Reserve numbers (Purpose), Street name
209 Beenyup Rd; 206, 577, 643 Gibbs Rd; 0 Tapper Rd; 418 Liddelow Rd; 541, 543 Bartram Rd; 541, 626, 638 Harper Rd; 37816 Gutteridge Rd
Crown Reserve

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Bassendean Dunes

Bassendean Sands (Qpb: S8)

Bassendean Dunes/Pinjarra Plain

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

Wetlands (within the Bassendean Dunes/Pinjarra Plain)

Holocene Swamp Deposits (Qhw: Ms5) (Qrw: Sp1)

VEGETATION AND FLORA

Vegetation Complexes

Bassendean Dunes

Bassendean Complex — Central and South



Floristic Community Types: *not sampled, types inferred

Supergroup 2: Seasonal Wetlands

- *4 *Melaleuca preissiana* damplands
- *11 Wet forests and woodlands
- *S3 Wet sedgeland on sandy clays

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau

- *21c Low lying *Banksia attenuata* woodlands or shrublands
- *22 *Banksia ilicifolia* woodlands
- *23a Central *Banksia attenuata* — *B. menziesii* woodlands

WETLANDS

Wetland Types: sumpland, artificial channel

Natural Wetland Groups

Bassendean Dunes

Jandakot (B.3)

Wetland Management Objectives: Conservation (61.6ha), Resource Enhancement

Swan Coastal Plain Lakes EPP: 2ha + 1.2ha + 3.8ha = 7ha (total)

THREATENED ECOLOGICAL COMMUNITIES

Not assessed, Not determined

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: open water, vegetated wetland, vegetated uplands

Vegetation and Flora: detailed survey (Keighery, GJ, 1992b), limited survey (DEP 1998, Trudgen 1990); part Bushplan Site - Semeniuk, V&C Research Group 1997a)

Structural Units: mapping (Keighery, GJ, 1992b, Trudgen 1990; part Bushplan Site - Semeniuk, V&C Research Group 1997)

Uplands: *Banksia attenuata* and *B. menziesii* Low Woodland; *Banksia attenuata* Low Woodland with scattered *B. menziesii*, *B. ilicifolia* and *Eucalyptus tottiana*

Wetlands: *Eucalyptus rudis* Tall Open woodland; *Melaleuca preissiana* Low Woodland over mixed Low Open Heath; *Melaleuca cuticularis* Low Open Woodland; *Melaleuca raphiophylla* Low Forest to Tall Open Scrub; Tall Scrub dominated by *Melaleuca viminea* and combinations of *M. raphiophylla*, *M. viminea* and *M. polygaloides*; *Pericalymma ellipticum* and *Calothamnus lateralis* Heath; *Hypocalymma angustifolium* Open Low Heath; Sedgeland dominated by *Restio stenostachyus*, *Baumea juncea* or *B. articulata* or *Baumea juncea* and *B. articulata*

Vegetation Condition: >80% Excellent, <20% Good to Completely Degraded (Trudgen 1990)

Total Flora: 201 native taxa (Keighery, GJ, 1992b) (estimated >75% expected flora)

Significant Flora: Keighery, GJ, 1992b — *Tripterococcus paniculatus* ms (1), *Phyllota gracilis* (3), *Macarthuria apetala*, *Restio stenostachyus* (largest known occurrence in intact bushland), *Gonocarpus pithyoides*

Fauna: no systematic survey. Significant mammal species: Quenda (Friend 1996 D)

Linkage: adjacent bushland to the north, south, east and west; part of proposed Greenway 96 (Tingay, Alan & Associates 1997a); part of a regionally significant fragmented bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: majority included in Jandakot Botanic Park Proposal (MfP 1995)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Diversity, Rarity, 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 Coastal Plain Lakes EPP, Peel-Harvey Estuary EPP/SPP; location of conservation category wetlands; under MRS Parks and Recreation Reservation and TPS Parks and Recreation Zoning, Crown Reserve

Constraints: private land; under General Mineral Resource Area (sand)

Recommendation: The care, control and management of parts of this Bushplan Site for conservation purposes within Jandakot Regional Park is endorsed. The most appropriate mechanism for the protection of the remainder of this Bushplan Site be considered through the public comment period in consultation with the land owner(s).



ANSTEY/KEANE DAMPLAND AND ADJACENT BUSHLAND, FORRESTDAL

Boundary Definition: protected area/bushland/conservation wetland 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. 342 **Map no.** 69, 75, 76 **Map sheet series ref. no.** 2033-I NE, 2033-I SE

Other Names

Hale Rd Bushland, Part Submission Areas 13 and 246 combined

Area (ha): total 368.1; bushland 311.6

Local Authorities (Suburb)

City of Armadale (Forrestdale)

Zoning

MRS: Rural, Parks and Recreation, Industrial

TPS: General Industry, General Rural, Public Purposes, Landscape

Ownership Categories

Private (including commercial organisation), State Government, Local Government

Lot/Location/Reserve numbers (Purpose),

Street name

1, 68, 70, 12, 100, 102 Anstey Rd; 63, 66 101 Keane Rd; 2 Forest Rd; 65, 67, 69 Hale Rd; 70 Ranford Rd; 20 Armadale Rd

Crown Reserve

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Bassendean Dunes

Bassendean Sands (Qpb: S8)

Bassendean Dunes/Pinjarra Plain

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

Wetlands (within the Bassendean Dunes/Pinjarra Plain)

Holocene Swamp Deposits (Qrw: Sp1, Sp2)

VEGETATION AND FLORA

Vegetation Complexes

Combinations of Bassendean Dunes/Pinjarra Plain

Southern River Complex

Floristic Community Types: *not sampled, types inferred

Supergroup 2: Seasonal Wetlands

*4 *Melaleuca preissiana* damplands

*5 Mixed shrub damplands

*8 Herb-rich shrublands in clay pans

*10a Shrublands on dry clay flats

* S2 Northern *Pericalymma ellipticum* dense low shrublands

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau

*21c Low lying *Banksia attenuata* woodlands or shrublands

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

WETLANDS

Wetland Types: sumpland, dampland, artificial channel

Natural Wetland Groups

Bassendean—Pinjarra transition OR Bassendean with fluvial features

Bennett Brook (B/P.4)

Wetland Management Objectives: Conservation (235ha), Resource Enhancement

Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Not assessed, Not determined, Endangered (floristic community type 10a), Vulnerable (floristic community type 8)

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated wetland, vegetated uplands

Vegetation and Flora: detailed survey (part Bushplan Site — Keighery, GJ, 1992a, Weston 1989a and 1990); limited survey (Trudgen 1990)

Structural Units: mapping (Weston 1989a and 1990); general mapping (Trudgen 1990)

Uplands: *Banksia attenuata*, *B. menziesii* and *Allocasuarina fraseriana* Low Woodland to Low Open Forest, with scattered *Eucalyptus marginata*, *E. todtiana* and *Nuytsia floribunda*

Wetlands: *Melaleuca preissiana* Low woodland; *Kunzea ericifolia* Tall Open Scrub; *Melaleuca raphiophylla* and *M. viminea* Tall Open Scrub; *Melaleuca teretifolia*, *M. viminea*, *M. incana*, *M. uncinata*, *M. lateriflora* and

M. lateritia Open Heath; *Actinostrobos pyramidalis* Tall Open Shrubland; *Regelia ciliata* Closed to Open Heath; *Pericalymma ellipticum* Closed to Open Heath; mixed Heath; *Evandra pauciflora* Sedgeland; mixed Herbland; (Many of the wetland communities are typical of the Pinjarra Plain and occur together in the area as a mosaic.)

Vegetation Condition: >75% Excellent to Pristine, <25% Very Good to Good, with areas of severe localised disturbance (Trudgen 1990)

Total Flora: 381 native taxa (Keighery, GJ, 1992a) (estimated >70% expected flora)

Significant Flora: *Diuris purdiei* (R) (Weston 1989a), *Jacksonia sericea* (3), *Tripterococcus paniculatus* ms (1), *Stylidium mimeticum* (3), *Stylidium longitubum* (3) (Keighery, GJ, 1992a), *Villarsia submersa* (4), *Verticordia lindleyi* subsp. *lindleyi* (4), *Drosera occidentalis* (4) (Keighery, GJ, 1992a); *Banksia telmatiaea*, *Restio stenostachyus*, *Beaufortia squarrosa*, *Stylidium utricularioides*, *Pityrodia uncinata* (southernmost population, Keighery, GJ, 1992a), *Dysphania glomulifera* subsp. *glomulifera* (one of two populations on the Swan Coastal Plain, Keighery, GJ, 1992a), *Evandra pauciflora*, *Myriocephalus helichrysoides* (Weston 1990), *M. isoetes*, *Blancoa canescens* (Weston 1990)

Fauna: no systematic survey. Significant mammal species: Quenda (Friend 1996 D)

Linkage: adjacent bushland to the north (BS413 across road), east and west; part of proposed Greenway 142 (Tingay, Alan & Associates 1997a); part of a regionally significant fragmented bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: majority included in Jandakot Botanic Park Proposal (MfP 1995); 'wetland of special note' (Payne 1993a); majority Bushplan Site Category One Area Middle Canning Catchment Study (Evangelisti & Associates *et al.* 1995); one of the most plant species diverse areas on the Swan Coastal Plain in the PMR, currently considered second to BS387); 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

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 MRS Industrial Zoning

Recommendation: The care, control and management of parts of this Bushplan Site for conservation purposes within Jandakot Regional Park is endorsed. The most appropriate mechanism for the protection of the remainder of this Bushplan Site be considered through the public comment period in consultation with the land owner(s).

DENIS DE YOUNG RESERVE AND GIBBS ROAD SWAMP BUSHLAND, BANJUP/FORRESTDAL

Boundary Definition: protected area/bushland (part taken to cadastre) 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. 344

Map no. 75

Map sheet series ref. no. 2033-I SE

Other Names

Part Submission Area 13

Area (ha): total 472.8 (includes open water); bushland 289.8

Local Authorities (Suburb)

City of Cockburn (Banjup), City of Armadale (Forrestdale)

Zoning

MRS: Parks and Recreation, Rural, Rural-Water Protection, Important Regional Roads

TPS: General Rural, Landscape, Public Purposes

Ownership Categories

Private (including commercial organisation), State Government, Local Government

Lot/Location/Reserve numbers (Purpose), Street name

27950 Armadale Rd; 27, 30, 36, 38, 39, 428, 429, 430 Taylor Rd; 34, 461, 27950, Forrestr Rd; 452 Bartram Rd; 3, 4, 9, 33 Nicholson Rd; 414, 425, 431, 531 Oxley Rd; 424 Liddelow Rd; 1, 33, 426, 427, 466, 534 Gibbs Rd; 303, 600 street not identified
Crown Reserve

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Bassendean Dunes

Bassendean Sands (Qpb: S8)

Bassendean Dunes/Pinjarra Plain

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

Wetlands (within the Bassendean Dunes/Pinjarra Plain)

Holocene Swamp Deposits (Qrw: Sp1, Sp2)

VEGETATION AND FLORA

Bassendean Dunes

Bassendean Complex — Central and South

Combinations of Bassendean Dunes/Pinjarra Plain/Spearwood Dunes

Southern River Complex

Floristic Community Types: *not sampled, types inferred

Supergroup 2: Seasonal Wetlands

*4 *Melaleuca preissiana* damplands

*11 Wet forests and woodlands

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau

21c Low lying *Banksia attenuata* woodlands or shrublands (Denis De Young Reserve)

22 *Banksia ilicifolia* woodlands (Denis De Young Reserve)

WETLANDS

Wetland Types: sumpland, dampland, artificial channel

Natural Wetland Groups

Bassendean—Pinjarra transition OR Bassendean with fluvial features

Bennett Brook (B/P.4)

Bassendean Dunes

Jandakot (B.3)

Wetland Management Objectives: Conservation (190ha), Resource Enhancement, Multiple Use

Swan Coastal Plain Lakes EPP: 7.7ha + 16.2ha + 0.2ha = 24.1ha (total)

THREATENED ECOLOGICAL COMMUNITIES

Not assessed

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: open water, vegetated wetland, vegetated uplands

Vegetation and Flora: detailed survey (part Bushplan Site (Denis De Young Reserve — Keighery, GJ, 1992b); limited survey (Gibson *et al.* 1994 (Dejong 01–02), part Bushplan Site — Keighery, GJ, 1994)

Structural Units: mapping (Keighery, GJ, 1992b and 1994)

Uplands: *Banksia attenuata* and *B. menziesii* Low Woodland; *Banksia attenuata* Low Woodland with scattered *B. menziesii*, *B. ilicifolia* and *Eucalyptus todtiana*

Wetlands: *Melaleuca preissiana* Low Woodland to Forest sometimes over *Baumea juncea* Sedgeland; *Melaleuca raphiophylla* Low Open Forest; *Pericalymma ellipticum*, *Astartea aff. fascicularis*, *Aotus intermedia* and *Calothamnus lateralis* Closed Heath; *Pericalymma ellipticum* Closed Heath; *Baumea juncea* and *B. articulata* Sedgelands

Scattered Native Plants: not assessed

Vegetation Condition: >60% Excellent to Very Good, <40% Good to Degraded, with areas of severe localised disturbance

Total Flora: 158 native taxa (part Bushplan Site — Keighery, GJ, 1992b) (estimated >60% expected flora)

Significant Flora: Keighery, GJ, 1992b — *Phyllota gracilis* (3), *Verticordia lindleyi* subsp. *lindleyi* (4); *Macarthuria apetala*

Fauna: limited survey (Submission no. 168g) for birds (34), native mammals (2), reptiles (7) and amphibians (1). Important breeding area for Freckled and Pink-eared ducks, Black Swan, Little Pied Cormorant, Eurasian Coot and Dusky Moorhen. Significant mammal species: Quenda (Friend 1996 D)

Linkage: adjacent bushland to the north (BS390), south, east and west; part of proposed Greenways 105, 96, 110 (Tingay, Alan & Associates 1997a); part of a regionally significant fragmented bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: majority included in Jandakot Botanic Park Proposal (MfP 1995); 'wetland of special note' (Payne 1993a); part Bushplan Site Category One Area Middle Canning Catchment Study (Evangelisti & Associates *et al.* 1995)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Directory of Important Wetlands in Australia; Not Listed; Indicative Place of the Register of the National Estate



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 Coastal Plain Lakes EPP, Peel-Harvey Estuary EPP/SPP, Swan and Canning Rivers EPP; location of conservation category wetlands; MRS Parks and Recreation Reservation and TPS Landscape Zoning, Crown Reserve

Constraints: private land; under MRD regional road requirements, General Mineral Resource Area (sand)

Recommendation: The care, control and management of parts of this Bushplan Site for conservation purposes within Jandakot Regional Park is endorsed. The most appropriate mechanism for the protection of the remainder of this Bushplan Site be considered through the public comment period in consultation with the land owner(s).

FORRESDALE LAKE AND ADJACENT BUSHLAND, FORRESDALE

Boundary Definition: protected area/bushland (part taken to cadastre)/conservation wetland 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. 345 **Map no.** 75, 76 **Map sheet series ref. no.** 2033-I SE

System 6 (1983): M95 area of bushland goes beyond System area boundaries, all bushland described

Other Names

Submission Area 256

Local Authorities (Suburb)

City of Armadale (Forrestdale, Brookdale)

Area (ha): total 658.2 (includes open water); bushland 344.5

Zoning

MRS: Parks and Recreation, Rural, Important Regional Roads, Controlled Access Highways

TPS: Landscape, Rural, General Rural

Lot/Location/Reserve numbers (Purpose),

Street name

75, 382 Forrest Rd; 11, 13, 276, 277, 278, 303, 381, 400, 500 Oxley Rd; 1 Nicholson Rd; 2, 12 Rowley Rd; 2, 3, 4, 5, 264 Lake Rd; 7, 8, 265, 279, 280, 281, 282, 283, 284, 405, 454, 459 Commercial Rd; 266, 267 Swamp Rd; 378, 379, 380 Stirling Rd; 111 street not identified

Crown Reserve

Reserve 24781 (Conservation of Flora and Fauna)

Ownership Categories

Private, State Government, Local Government

CALM Managed Land

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Pinjarra Plain

Guildford Formation (Qpa: Cs, Sc)

Bassendean Dunes

Bassendean Sands (Qpb: S8)

Bassendean Dunes/Pinjarra Plain

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

Wetlands (within the Bassendean Dunes/Pinjarra Plain)

Holocene Swamp Deposits (Qrw: Sp1, Sp2)

Lagoonal and Estuarine Deposits (within the Bassendean Dunes/Pinjarra Plain)

Lagoonal and Estuarine Deposits (Vasse) (Qhg: LS5)

Lagoonal deposits in Bassendean Dunes (Qpw: S9)

VEGETATION AND FLORA

Vegetation Complexes

Bassendean Dunes

Bassendean Complex — Central and South

Combinations of Bassendean Dunes/Pinjarra Plain

Southern River Complex



Floristic Community Types

Supergroup 2: Seasonal Wetlands

- 4 *Melaleuca preissiana* damplands
- 8 Herb-rich shrublands in clay pans
- 10a Shrublands on dry clay flats
- 12 *Melaleuca teretifolia* and/or *Astartea* aff. *fascicularis* shrublands

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau

- 21a Central *Banksia attenuata* — *Eucalyptus marginata* woodlands
- 21c Low lying *Banksia attenuata* woodlands or shrublands

WETLANDS

Wetland Types: lake, dampland, sumpland, palusplain, artificial channel

Natural Wetland Groups

Bassendean Dunes

Jandakot (B.3)

Pinjarra Plain

Keysbrook (P.1)

Bassendean—Pinjarra transition OR Bassendean with fluvial features

Bennett Brook (B/P.4)

Wetland Management Objectives: Conservation (446.8ha), Resource Enhancement, Multiple Use

Swan Coastal Plain Lakes EPP: 220.5ha + 0.7ha + 2.7ha + 1.8ha + 0.8ha + 1.8ha + 22.7ha = 251ha (total)

THREATENED ECOLOGICAL COMMUNITIES

Not assessed, Endangered (floristic community type 10a), Vulnerable (floristic community type 8)

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: open water, vegetated wetland, vegetated uplands

Vegetation and Flora: limited survey (part Bushplan Site — EPA and WAWA 1990, Gibson *et al.* 1994 (FL 01–10), Keighery, GJ, 1992a, Keighery, BJ, and Trudgen 1992)

Structural Units: mapping (CALM 1987, Keighery, BJ, and Trudgen 1992)

Uplands: *Eucalyptus calophylla* Open Woodland; *Banksia attenuata* and *B. menziesii* Open Forest to Woodland with *Nuytsia floribunda*; *Banksia littoralis* and *B. menziesii* Open Forest to Woodland with *Nuytsia floribunda*

Wetlands: *Melaleuca preissiana* and *M. raphiophylla* Low Open Forest with patches of *Eucalyptus rudis*; *Melaleuca preissiana* Open Woodland; *Melaleuca raphiophylla* Low Closed Forest; *Melaleuca uncinata*, *M. polygaloides* and *M. viminea* Closed Heath; *Regelia ciliata* Closed Heath; *Melaleuca teretifolia* and *M. viminea* Open Heath; mixed Closed Herbland; *Hypolaena exsulca*, *Lyginia barbata* and *Schoenus curvifolius* Closed Sedgeland; *Leptocarpus canus* Sedgeland; Closed Sedgelands dominated by *Baumea articulata*, **Typha orientalis* and *Bolboschoenus caldwellii*

Scattered Native Plants: *Melaleuca raphiophylla* Low Closed Forest to Low Open Woodland, *Banksia attenuata* and *B. menziesii* Open Forest to Woodland, scattered native shrubs

Vegetation Condition (bushland): >50% Excellent to Very Good, <50% Good to Degraded, with areas of severe localised disturbance

Total Flora: 312 native taxa (Keighery, GJ, 1992a) (estimated >75% expected flora)

Significant Flora: *Diuris purdiei* (R), *Drakaea elastica* (R), *Acacia lasiocarpa* subsp. *bracteolata* (1) (Keighery, GJ, 1992a), *Eryngium pinnatifidum* subsp. *palustre* ms (2), *Stylidium mimeticum* (3) (Keighery, GJ, 1992a), *Villarsia submersa* (4), *Drosera occidentalis* (4), *Verticordia lindleyi* subsp. *lindleyi* (4) (Keighery, GJ, 1992a), *Anthotium junciforme* (4) (Keighery, GJ, 1992a); *Pimelea imbricata* var. *major*, *Villarsia violifolia*, *Burchardia bairdiae*, *Leptocarpus* sp. Forrestdale Lake, *Myriocephalus helichrysoides*

Fauna: surveyed by RAOU (1996 D), numerous visits, and CALM (1987) for birds (135), native mammals (4), reptiles (15) and amphibians (7). Important feeding area for exceptionally wide variety of waterbirds and a large assemblage (21 species) and population level of trans-equatorial wading birds protected under the JAMBA/CAMBA treaties. Significant bird species: category 1 (2), category 2 (21), category 3 (16) and category 4 (9). Significant mammal species: Quenda and Western Brush wallaby. Significant reptile species: Swamp Skink (*Acritoscincus trilineatum*), Lined Skink (*Lerista lineata*) and Crowned Snake (*Notechis coronatus*)

Linkage: adjacent bushland to the north, south, east and west; part of proposed Greenways 110, 134, 85, 96, 142 (Tingay, Alan & Associates 1997a); part of a regionally significant fragmented bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: 'wetland of special note' (Payne 1993a); majority Bushplan Site Category One and Two Areas, Middle Canning Catchment Study (Evangelisti & Associates *et al.* 1995); National Trust of Australia (WA) Classification; contains plant communities representative of the eastern side of the Swan Coastal Plain

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Wetlands of International Importance (RAMSAR); Directory of Important Wetlands in Australia, Indicative Place of the Register of the National Estate; Location for JAMBA/CAMBA species; Not listed; Indicative Place of the Register of the National Estate

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 Coastal Plain Lakes EPP, Peel-Harvey Estuary EPP/SPP, Swan and Canning Rivers EPP; location of Declared Rare Flora and Scheduled Fauna, conservation category wetlands; under MRS Parks and Recreation Reservation and Landscape Zoning, Crown Reserve
Constraints: private land; under MRD regional road requirements, General Mineral Resource Area (sand)

Recommendation: The existing purpose, care, control and management of Reserve 24781 is endorsed. Parts of the Bushplan Site are already reserved for Parks and Recreation in the Metropolitan Region Scheme, and should be added to Forrestdale Lake Nature Reserve. The most appropriate mechanism for the protection of the remainder of this Bushplan Site be considered through the public comment period in consultation with the land owner(s).

WANDI NATURE RESERVE AND ANKETELL ROAD BUSHLAND, WANDI/OAKFORD

Boundary Definition: protected area/bushland/conservation wetland boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 347 **Map no.** 81, 82 **Map sheet series ref. no.** 2033-I SE, 2033-I SW
System 6 (1983): M97 area of bushland goes beyond System area boundaries, all bushland described

Other Names

Magenup Swamp, Part Submission Area 13

Local Authorities (Suburb)

Town of Kwinana (Wandi, Oakford), Shire of Serpentine-Jarrahdale (Oakford)

Ownership Categories

Private (including commercial organisation), State Government, Local Government, Not identified

Area (ha): total 558.1 (includes open water); bushland 412.3

Zoning

MRS: Parks and Recreation, Rural-Water Protection

TPS: Special Rural, Rural, Landscape

Lot/Location/Reserve numbers (Purpose),

Street name

1, 5, 30, 31, 102, 154, 202 Anketell Rd; 106 Nicholson Rd; 116, 1333 De Haer Rd; 107 Thomas Rd; 48, 1354 Leslie Rd; 8, 700 street not identified
 Crown Reserve
 Reserve 36110 (Conservation of Flora and Fauna and Water)

CALM Managed Land

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Pinjarra Plain

Guildford Formation (Qpa: Sc)

Bassendean Dunes

Bassendean Sands (Qpb: S8)

Bassendean Dunes/Pinjarra Plain

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

Wetlands (within the Bassendean Dunes/Pinjarra Plain)

Holocene Swamp Deposits (Qrw: Sp1, Sp2)

VEGETATION AND FLORA

Vegetation Complexes

Bassendean Dunes

Bassendean Complex — Central and South

Floristic Community Types: *not sampled, types inferred

Supergroup 2: Seasonal Wetlands

*4 *Melaleuca preissiana* damplands

*5 Mixed shrub damplands

*12 *Melaleuca teretifolia* and/or *Astartea* aff. *fascicularis* shrublands

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau

*22 *Banksia ilicifolia* woodlands

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

WETLANDS

Wetland Types: sumpland, dampland, artificial channel

Natural Wetland Groups

Bassendean Dunes

Jandakot (B.3)



Wetland Management Objectives: Conservation (37.7ha), Resource Enhancement, Multiple Use
Swan Coastal Plain Lakes EPP: 12.4ha + 0.7ha + 3.7ha + 2.2ha = 19ha (total)

THREATENED ECOLOGICAL COMMUNITIES

Not assessed

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: open water, vegetated wetland, vegetated uplands

Vegetation and Flora: detailed survey (part Bushplan Site — Keighery, GJ, 1992c, Keighery, GJ, and Keighery 1993b (Wandi NR), Weston 1989b (Lots 106 & 107)); limited survey (Gibson *et al.* 1994 (Wand 01), Trudgen 1990)

Structural Units: mapping (Trudgen 1990, Weston 1989b (Lots 106 & 107))

Uplands: *Banksia attenuata*, *B. menziesii*, *B. ilicifolia*, *Allocasuarina fraseriana* and *Eucalyptus todtiana* Low Woodland; *Banksia attenuata*, *B. menziesii* and *B. ilicifolia* Low Woodland

Wetlands: *Melaleuca preissiana* Woodland; *Melaleuca raphiophylla* Forest; *Pericalymma ellipticum* Closed Heath; *Astartea aff. fascicularis* Closed Heath; Sedgeland of *Restio stenostachyus* and *Lepidosperma longitudinale*

Scattered Native Plants: scattered trees and clumps of *Eucalyptus calophylla* and *Melaleuca preissiana*

Vegetation Condition: >75% Excellent to Very Good, <25% Very Good to Degraded (mapping Trudgen 1990)

Total Flora: 158 native taxa in Wandi Nature Reserve (Keighery, GJ, and Keighery 1993b) (estimated >90% expected flora for *Banksia* Woodland)

Significant Flora: Keighery, GJ, and Keighery 1993b — *Eucalyptus todtiana* (southernmost in a reserve), *Brachyloma preissii*; Weston 1989b — *Restio stenostachyus*, *Cyrtostylis* sp. (an uncommon species in Bassendean Sands)

Fauna: no systematic survey. Significant mammal species: Quenda (Friend 1996 D)

Linkage: adjacent bushland to the north, south, east and west; part of proposed Greenway 110 (Tingay, Alan & Associates 1997a); part of a regionally significant fragmented bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: majority of Bushplan Site included in Jandakot Botanic Park Proposal (MfP 1995)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Listed on the Register of the National Estate (Wandi Nature Reserve)

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, 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 Coastal Plain Lakes EPP, Peel-Harvey Estuary EPP/SPP; location of conservation category wetlands; under MRS Parks and Recreation Reservation and TPS Landscape Zoning, Crown Reserve

Constraints: private land; under General Mineral Resource Area (sand, clay)

Recommendation: The care, control and management of part of this Bushplan Site (Reserve 36110) for conservation purposes within Jandakot Regional Park is endorsed. The most appropriate mechanism for the protection of the remainder of this Bushplan Site be considered through the public comment period in consultation with the land owner(s).

MANDOGALUP ROAD BUSHLAND, MANDOGALUP

Boundary Definition: bushland (part taken to cadastre) boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 268 **Map no.** 81 **Map sheet series ref. no.** 2033-I SW

Other names: not known

Area (ha): total 99.6; bushland 95.9

Local Authorities (Suburb)

Zoning

Town of Kwinana (Mandogalup)

MRS: Rural, Parks and Recreation, Important Regional Roads

TPS: Rural A, Rural B, Landscape

Ownership Categories

Lot/Location/Reserve numbers (Purpose),

Local Government, Private (including commercial organisation)

Street name

5 Norkett Rd; 89 Mandogalup Rd; 24 Hope Valley Rd; 1 street not identified

Crown Reserve



SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Bassendean Dunes

Bassendean Sands (Qpb: S8)

Spearwood Dunes

Sands derived from Tamala Limestone (Qts: S7)

Wetlands (within the Spearwood Dunes)

Holocene Swamp Deposits (Qhw: Ms5)

VEGETATION AND FLORA

Vegetation Complexes

Bassendean Dunes

Bassendean Complex — Central and South

Spearwood Dunes

Karrakatta Complex — Central and South

Wetlands

Herdsmen Complex

Floristic Community Types: *not sampled, types inferred

Supergroup 4: Uplands centred on Spearwood and Quindalup Dunes

*25 Southern *Eucalyptus gomphocephala* — *Agonis flexuosa* woodlands

*28 Spearwood *Banksia attenuata* or *B. attenuata* — *Eucalyptus* woodlands

WETLANDS

No wetlands mapped

THREATENED ECOLOGICAL COMMUNITIES

Not assessed

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated uplands

Vegetation and Flora: limited survey (DEP 1998 roadside observations)

Structural Units

Uplands: *Eucalyptus gomphocephala* Low Open woodland over scattered *E. marginata*, *Banksia attenuata* and *B. grandis*; Mixed *Eucalyptus marginata*, *Banksia attenuata*, *B. menziesii*, *B. grandis* Open Forest; *Banksia attenuata*, *B. menziesii* Low Open Forest with scattered emergent trees of *Eucalyptus gomphocephala*

Wetlands: *Eucalyptus rudis* Open Forest over *Melaleuca raphiophylla*, *M. preissiana*, *Banksia littoralis* Low Open Forest

Scattered Native Plants: *Eucalyptus gomphocephala* Open Woodland to Woodland

Vegetation Condition: >75% Excellent, >20% Good, with areas of severe localised disturbance

Total Flora: not known

Significant Flora: none recorded

Fauna: no systematic survey. Significant mammal species: Quenda (Friend 1996 D)

Linkage: adjacent bushland to the south (BS269 across road), east and west; part of proposed Greenway 93 (Tingay, Alan & Associates 1997a); part of a regionally significant contiguous bushland/wetland linkage (Volume 2A, Map 8)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Rarity, 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

Opportunities and/or Constraints

Opportunities: Bushplan Site/part Bushplan Site subject to Peel-Harvey Estuary EPP/SPP; under MRS Parks and Recreation Reservation and TPS Landscape Zoning, Crown Reserve

Constraints: private land; under MRD regional road requirements

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s).



THE SPECTACLES

Boundary Definition: protected area boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 269

Map no. 81

Map sheet series ref. no. 2033-I SW

Other Names

Submission Area 6

Local Authorities (Suburb)

Town of Kwinana (The Spectacles)

Ownership Categories

Private (including commercial organisation), State Government

Area (ha): total 422.4 (includes open water); bushland 349.7

Zoning

MRS: Parks and Recreation, Railways

TPS: Landscape

Lot/Location/Reserve numbers (Purpose),

Street name

627, 628, 629, 630, 631, 632, 633, 1138, 1139, 1140, 1141, 1142, 1143, 1144, 1145, 1146, 1147, 1148, 1149, 1162, 1163, 1164, 1165 Mclaughlan Rd; 633, 634 Hope Valley Rd; 77, 78, 79, 80, 1150, 1190, 1191, 1193, 1194, 1195, 1196, 1197, 1198, 1295, 1302 Anketell Rd; 1, 7, 1151, 1152, 1153, 1154, 1155, 1156, 1157, 1158, 1159, 1203 Johnson Rd; 1, 2, 3, 4, 1296, 1297, 1298, 1299 Thomas Rd; 1192 Spectacles Dr

Crown Reserve

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Bassendean Dunes

Bassendean Sands (Qpb: S8) (at interface of Bassendean and Spearwood Dunes)

Spearwood Dunes

Sands derived from Tamala Limestone (Qts: S7)

Tamala Limestone (Qtl: LS1)

Wetlands (within the Spearwood/Bassendean Dunes interface)

Holocene Swamp Deposits (Qhw: Ms5)

VEGETATION AND FLORA

Vegetation Complexes

Bassendean Dunes

Bassendean Complex — Central and South (at interface of Bassendean Complex — Central and South and Karrakatta Complex — Central and South)

Spearwood Dunes

Karrakatta Complex — Central and South

Cottesloe Complex — Central and South

Wetlands

Herdsmen Complex

Floristic Community Types: *not sampled, types inferred

Supergroup 2: Seasonal Wetlands

*11 Wet forests and woodlands

Supergroup 4: Uplands centred on Spearwood and Quindalup Dunes

*28 Spearwood *Banksia attenuata* or *B. attenuata* — *Eucalyptus* woodlands

WETLANDS

Wetland Types: sumpland, dampland, principal channel

Natural Wetland Groups

Bassendean Dunes

Jandakot (B.3)

Spearwood—Bassendean interface

Bibra (S/B.1)

Wetland Management Objectives: Conservation (166.7ha), Multiple Use

Swan Coastal Plain Lakes EPP: 62.1ha + 14.1ha = 76.2ha (total)

THREATENED ECOLOGICAL COMMUNITIES

Not assessed

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: open water (fresh), vegetated wetland, vegetated uplands

Vegetation and Flora: limited survey (EPA and WAWA 1990, Glossop 1979, Weston 1993)

Structural Units: mapping (EPA and WAWA 1990, Glossop 1979)

Uplands: *Eucalyptus calophylla* and *Banksia attenuata* Low Woodland

Wetlands: *Eucalyptus rudis* Low Woodland to Low Open Forest; *Melaleuca raphiophylla* and *M. teretifolia* Low Closed Forest; *Melaleuca raphiophylla* Low Open Forest to Low Closed Forest; *Baumea articulata* Closed Sedgeland; Mixed Sedgeland; *Leptocarpus* Open Sedgeland

Scattered Native Plants: *Melaleuca preissiana* Low Woodland; *Eucalyptus calophylla* and *Banksia attenuata* Low Woodland - regionally significant vegetation recognised as being included in the area of Bushplan Site in need of protection

Vegetation Condition: >60% Excellent to Very Good, <40% Good to Degraded (Weston 1993)

Total Flora: 104 native taxa, 8 weeds (estimated >75% expected flora) (Glossop 1979)

Significant Flora: *Dodonaea hackettiana* (4)

Fauna: multiple surveys by RAOU (1996 D) for birds. Equal highest number of breeding waterfowl (12 species) and equal 14th wetland for highest number of species (33) during RAOU wetland survey in 1990-92 (Storey *et al.* 1993)

Linkage: adjacent bushland to the north (BS268 across road), south (BS272 across road), east (across Freeway) and west; part of proposed Greenways 93, 100 (Tingay, Alan & Associates 1997a); part of a regionally significant contiguous bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: included in Beelihar Regional Park Proposal (DPUD 1992a)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Interim List of the Register of the National Estate; Directory of Important Wetlands in Australia

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Diversity, Rarity, Maintaining ecological processes or natural systems, 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

Opportunities and/or Constraints

Opportunities: Bushplan Site/part Bushplan Site subject to Swan Coastal Plain Lakes EPP, Peel-Harvey Estuary EPP/SPP; location of conservation category wetlands; under MRS Parks and Recreation Reservation and TPS Landscape Zoning, Crown Reserve

Constraints: private land

Recommendation: The care, control and management of this Bushplan Site for conservation purposes within Beelihar Regional Park is endorsed.

SANDY LAKE AND ADJACENT BUSHLAND, ANKETELL

Boundary Definition: protected area/bushland taken to cadastre/conservation wetland boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 270 Map no. 81 Map sheet series ref. no. 2033-I SW

Other Names

Part Submission Area 13

Local Authorities (Suburb)

Town of Kwinana (Anketell)

Area (ha): total 228.4 (includes open water); bushland 201.4

Zoning

MRS: Parks and Recreation, Rural, Rural-Water Protection, Important Regional Roads, Controlled Access Highways

TPS: Rural A, Park Recreation and Drainage, Landscape

Ownership Categories

Private (including commercial organisation), State Government

Lot/Location/Reserve numbers (Purpose),

Street name

5, 8, 9 Thomas Rd; 12, 13, 14, 100, 1190, 1191, 1192, 1193, 1194, 1195, 1196, 1197, 1198 Treeby Rd; 10 street not identified

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Bassendean Dunes

Bassendean Sands (Qpb: S8)



Bassendean Dunes/Pinjarra Plain

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

Spearwood Dunes

Sands derived from Tamala Limestone (Qts: S7)

Wetlands (within the Spearwood/Bassendean Dunes/Pinjarra Plain)

Holocene Swamp Deposits (Qhw: Cps, Ms5)

VEGETATION AND FLORA

Vegetation Complexes

Bassendean Dunes

Bassendean Complex — Central and South

Spearwood Dunes

Cottesloe Complex — Central and South

Floristic Community Types: *not sampled, types inferred

Supergroup 2: Seasonal Wetlands

*5 Mixed shrub damplands

*11 Wet forests and woodlands

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau

*21a Central *Banksia attenuata* — *Eucalyptus marginata* woodlands

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

Supergroup 4: Uplands centred on Spearwood and Quindalup Dunes

*28 Spearwood *Banksia attenuata* or *B. attenuata* — *Eucalyptus* woodlands

WETLANDS

Wetland Types: sumpland, dampland, artificial channel

Natural Wetland Groups

Bassendean Dunes

Jandakot (B.3)

Wetland Management Objectives: Conservation (63.4ha)

Swan Coastal Plain Lakes EPP: 5.4ha

THREATENED ECOLOGICAL COMMUNITIES

Not assessed

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: open water, vegetated wetland, vegetated uplands

Vegetation and Flora: limited survey (Dames and Moore 1988b, DEP 1998 fenceline survey; part Bushplan Site — Hart Simpson and Associates 1989, Trudgen 1990)

Structural Units: mapping (Dames and Moore 1988b, part Bushplan Site — Hart Simpson and Associates 1989, Trudgen 1990)

Uplands — Sands derived from Tamala Limestone: *Banksia attenuata* and *B. menziesii* Low Woodland to Low Open Forest, with scattered emergent *Eucalyptus gomphocephala* or *E. marginata*.

Uplands — Bassendean Dunes: *Banksia attenuata* and *B. menziesii* Low Woodland to Low Open Forest, with scattered emergent *Eucalyptus marginata* and scattered *Allocasuarina fraseriana*, *Nuytsia floribunda* and rarely, *Eucalyptus tottiana*

Wetlands: *Melaleuca raphiophylla* and *Eucalyptus rudis* Low Forest to Woodland occasionally with scattered *Melaleuca preissiana* and *Banksia littoralis*; *Melaleuca preissiana* and *M. raphiophylla* Woodland with scattered *Banksia littoralis* and *Eucalyptus rudis*; Myrtaceous Closed Heaths dominated by *Kunzea ericifolia* and *Melaleuca thymoides*; Closed Sedgeland to Sedgeland dominated by *Baumea articulata* or *Lepidosperma longitudinale*

Scattered Native Plants: not assessed

Vegetation Condition: >80% Very Good to Excellent, <20% Good to Degraded, with areas of severe localised disturbance associated with localised clearing

Total Flora: 250 native taxa (estimated from Hart, Simpson and Associates 1989, expected to be >80% flora)

Significant Flora: none recorded

Fauna: limited survey by Hart, Simpson and Associates (1989) for birds (29), native mammals (2), reptiles (7) and amphibians (1). Significant bird species: category 3 (3) and category 4 (3). Significant mammal species: Quenda

Linkage: adjacent bushland to the south (across road), east and west (BS269, across freeway); part of proposed Greenway 110 (Tingay, Alan & Associates 1997a); part of a regionally significant fragmented bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: part included in Jandakot Botanic Park Proposal (MfP 1995)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Rarity, 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 Coastal Plain Lakes EPP, Peel-Harvey Estuary EPP/SPP; location of conservation category wetlands; under MRS Parks and Recreation Reservation and TPS Landscape Zoning

Constraints: private land; under MRD regional road requirements, General Mineral Resource Area (sand)

Recommendation: The care, control and management of this Bushplan Site for conservation purposes within Jandakot Regional Park is endorsed.

MODONG NATURE RESERVE AND ADJACENT BUSHLAND, OAKFORD

Boundary Definition: protected area/bushland (part taken to cadastre)/conservation wetland 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. 348 **Map no.** 82 **Map sheet series ref. no.** 2033-I SE
System 6 (1983): M99 area of bushland goes beyond System area boundaries, all bushland described

Other Names: not known

Area (ha): total 241.8; bushland 234.2

Local Authorities (Suburb)

Shire of Serpentine-Jarrahdale (Oakford)

Zoning

MRS: Parks and Recreation, Rural, Rural-Water Protection, Important Regional Roads

TPS: Rural, Landscape

Ownership Categories

State Government, Private

Lot/Location/Reserve numbers (Purpose),

Street name

112, 1348 Thomas Rd; 795 Anketell Rd; 22, 23 Cumming Rd; 42 Orton Rd

Crown Reserve

Reserve 25886 (Conservation of Flora and Fauna)

CALM Managed Land

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Pinjarra Plain

Guildford Formation (Qpa: Sc)

Bassendean Dunes

Bassendean Sands (Qpb: S8)

Bassendean Dunes/Pinjarra Plain

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

Wetlands (within the Bassendean Dunes/Pinjarra Plain)

Holocene Swamp Deposits (Qrw: Sp1)

VEGETATION AND FLORA

Vegetation Complexes

Bassendean Dunes

Bassendean Complex — Central and South

Floristic Community Types

Supergroup 2: Seasonal Wetlands

4 *Melaleuca preissiana* damplands

11 Wet forests and woodlands

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau

21c Low lying *Banksia attenuata* woodlands or shrublands

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

WETLANDS

Wetland Types: dampland, artificial channel

Natural Wetland Groups

Bassendean Dunes

Jandakot (B.3)

Wetland Management Objectives: Conservation (113.8ha)

Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Not assessed



SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated wetland, vegetated uplands

Vegetation and Flora: limited survey (part Bushplan Site — Crook 1980, Keighery, GJ, 1996 (Modong Nature Reserve), Gibson *et al.* 1994 (Modo 01-06))

Structural Units

Uplands: *Eucalyptus calophylla* Woodland; *Banksia attenuata* Low Woodland; *Banksia attenuata* and *B. ilicifolia* Low Open Forest

Wetlands: *Melaleuca preissiana* and *Banksia attenuata* Low Woodland; *Eucalyptus rudis* and *Melaleuca preissiana* Low Woodland; *Melaleuca preissiana* Low Open Woodland; *Pericalymma ellipticum* and *Hypocalymma angustifolium* Open Heath

Vegetation Condition: >90% Excellent to Pristine, <10% Very Good to Good (Gibson *et al.* 1994, Trudgen 1990)

Total Flora: 197 native taxa (Keighery, GJ, 1996) (estimated <80% expected flora)

Significant Flora: *Styliidium mimeticum* (3); *Macarthuria apetala*, *Evandra pauciflora*, *Hensmania turbinata*, *Burchardia bairdii* (most southern population)

Fauna: structured surveys by WA Society of Amateur Herpetologists (unpublished) for reptiles (25) and amphibians (3). Significant reptile species: legless lizards (*Pletholax gracilis* and *Pygopus lepidopodus*), Lined Skink (*Lerista lineata*), Swamp Skink (*Acritoscincus trilineatum*), Black Monitor (*Varanus tristis*) and Rosenberg's Monitor (*V. rosenbergii*). Good assemblage of insectivorous and nectarivorous birds (J. Dell pers. comm.). Significant mammal species: Quenda (Friend 1996 D)

Linkage: adjacent bushland to the north, east and west; part of proposed Greenway 110 (Tingay, Alan & Associates 1997a); part of a regionally significant fragmented bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: majority included in Jandakot Botanic Park Proposal (MfP 1995); 'key site representing the vegetation and habitats typical of the Bassendean Dune System' (Crook 1980)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed, Indicative Place of Register of the National Estate

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, 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 Peel-Harvey Estuary EPP/SPP; location of conservation category wetlands; under MRS Parks and Recreation Reservation and TPS Landscape Zoning, Crown Reserve

Constraints: private land; under MRD regional road requirements, General Mineral Resource Area (sand)

Recommendation: The care, control and management of this Bushplan Site (Reserve 25886) for conservation purposes within Jandakot Regional Park is endorsed.

CASUARINA PRISON BUSHLAND, CASUARINA

Boundary Definition: protected area/bushland (part taken to cadastre) boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 273 **Map no.** 81, 82 **Map sheet series ref. no.** 2033-I SE, 2033-I SW
System 6 (1983): M98 Part System area bushland, only bushland described

Other Names

Part Submission Area 13 and Submission Area 222

Local Authorities (Suburb)

Town of Kwinana (Casuarina)

Area (ha): total 118.2; bushland 116.9

Zoning

MRS: Parks and Recreation, Rural, Rural-Water Protection, Public Purposes-Prison

TPS: Landscape

Lot/Location/Reserve numbers (Purpose),

Street name

63, 126, 702 Orton Rd

Crown Reserve

Ownership Categories

State Government

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Bassendean Dunes

Bassendean Sands (Qpb: S8)

Bassendean Dunes/Pinjarra Plain

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



VEGETATION AND FLORA

Vegetation Complexes

Bassendean Dunes

Bassendean Complex — Central and South

Floristic Community Types

Supergroup 2: Seasonal Wetlands

4 *Melaleuca preissiana* damplands

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau

21a Central *Banksia attenuata* — *Eucalyptus marginata* woodlands

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

WETLANDS

Wetland Types: dampland, artificial channel

Natural Wetland Groups

Bassendean Dunes

Jandakot (B.3)

Wetland Management Objectives: Conservation (1.3ha), Resource Enhancement

Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Not assessed

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated wetland, vegetated uplands

Vegetation and Flora: limited survey (DEP 1996 (Cas 01-04), Trudgen 1990)

Structural Units: mapping (Trudgen 1990)

Uplands: *Banksia attenuata*, *B. ilicifolia* and *Eucalyptus marginata* Low Woodland; *Banksia attenuata* and *B. ilicifolia* Low Open Forest

Wetlands: *Melaleuca preissiana* and *Nuytsia floribunda* Low Open Woodland; *Melaleuca preissiana* Woodland over *Banksia littoralis* Low Woodland

Vegetation Condition: >90% Excellent to Pristine, <10% Very Good to Good

Total Flora: 104 native taxa (plot-generated list only) (>50% expected flora)

Significant Flora: *Lysinema elegans* (one of two known significant populations south of Gnangara), *Burchardia bairdiae*, *Drosera gigantea* subsp. *geniculata* ms, *Hensmania turbinata*

Fauna: no systematic survey. Significant mammal species: Quenda (Friend 1996 D)

Linkage: adjacent bushland to the north (across road), south, east (across road) and west; part of a regionally significant fragmented bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: part Bushplan Site included in Jandakot Botanic Park Proposal (MFP 1995)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, 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 Coastal Plain Lakes EPP, Peel-Harvey Estuary EPP/SPP; location of conservation category wetland; under MRS Parks and Recreation Reservation and TPS Landscape Zoning, Crown Reserve

Constraints: under General Mineral Resource Area (sand)

Recommendation: The care, control and management of parts of this Bushplan Site for conservation purposes within Jandakot Regional Park is endorsed. For the remainder of the Bushplan Site — 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.



DUCKPOND BUSHLAND, PEEL ESTATE

Boundary Definition: bushland (part taken to cadastre) boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 70 **Map no.** 89 **Map sheet series ref. no.** 2033-II NE

Other Names: not known **Area (ha):** total 23.8; bushland 23.5

Local Authorities (Suburb)
Shire of Serpentine-Jarrahdale (Oldbury)

Zoning
MRS: Rural
TPS: Rural
Lot/Location/Reserve numbers (Purpose),
Street name
41, 45 Duckpond Rd

Ownership Categories
Private

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Bassendean Dunes
Bassendean Sands (Qpb: S8)
Bassendean Dunes/Pinjarra Plain
Bassendean Sands over Guildford Formation (Qpb/Qpa:S10)

VEGETATION AND FLORA

Vegetation Complexes
Pinjarra Plain
Guildford Complex
Bassendean Dunes
Bassendean Complex - Central and South
Floristic Community Types: *not sampled, types inferred
Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau
*21a Central *Banksia attenuata* — *Eucalyptus marginata* woodlands

WETLANDS

Wetland Types: palusplain
Natural Wetland Groups
Pinjarra Plain
Keysbrook (P.1)
Bassendean Dunes
Jandakot (B.3)
Wetland Management Objectives: Multiple Use
Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Not assessed

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated wetland, vegetated uplands
Vegetation and Flora: limited survey (DEP 1998 roadside survey, Matiske Consulting Pty. Ltd. 1997)
Structural Units
Uplands: *Eucalyptus marginata*, *Banksia attenuata*, *B. menziesii* and *Allocasuarina fraseriana* Woodland to Open Forest, with occasional *B. ilicifolia*; *Xanthorrhoea preissii*, *Macrozamia riedlei* and *Hibbertia hypericoides* Open Shrubland
Wetlands: no known information
Scattered Native Plants: not assessed
Vegetation Condition: >50% Excellent, >45% Very Good to Good, with areas of severe localised disturbance
Total Flora: not known
Significant Flora: none recorded

Fauna: no known information
Linkage: adjacent bushland to the north, south and east; part of a regionally significant potential bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: mapped within area 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, General criteria for the protection of wetland, streamline and estuarine fringing and coastal vegetation

Opportunities and/or Constraints

Opportunities: Bushplan Site subject to Peel-Harvey Estuary EPP/SPP

Constraints: private land; under General Mineral Resource Area (clay)

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s).

BANKSIA ROAD NATURE RESERVE, PEEL ESTATE

Boundary Definition: protected area boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 353 **Map no.** 89 **Map sheet series ref. no.** 2033-II NE

System 6 (1983): M100 All System area bushland, total area described

Other Names

Reserve C28167, Part Submission Area 13

Local Authorities (Suburb)

Shire of Serpentine-Jarrahdale (Oldbury), Town of Kwinana (Casuarina)

Ownership Categories

State Government

Area (ha): total 32.9; bushland 32.3

Zoning

MRS: Parks and Recreation, Rural

TPS: Rural, Landscape

Lot/Location/Reserve numbers (Purpose),

Street name

26 Coyle Rd; 442 Banksia Rd

Crown Reserve

Reserve 28167 (Conservation of Flora and Fauna)

CALM Managed Land

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Bassendean Dunes

Bassendean Sands (Qpb: S8)

Wetlands (within the Bassendean Dunes)

Holocene Swamp Deposits (Qrw: Sp1)

VEGETATION AND FLORA

Vegetation Complexes

Bassendean Dunes

Bassendean Complex — Central and South

Floristic Community Types

Supergroup 2: Seasonal Wetlands

13 Deeper wetlands on heavy soils

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau

22 *Banksia ilicifolia* woodlands

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

WETLANDS

Wetland Types: dampland

Natural Wetland Groups

Bassendean Dunes

Jandakot (B.3)

Wetland Management Objectives: Conservation (1.9ha)

Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Not assessed

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated wetland, vegetated uplands

Vegetation and Flora: detailed survey (Keighery, GJ, 1996), limited survey (Crook 1980, Gibson *et al.* 1994 (Bank 01-04), Trudgen 1990)



Structural Units: mapping (Crook 1980)

Uplands: *Banksia attenuata*, *B. menziesii* and *Allocasuarina fraseriana* Low Woodland with scattered emergent *Eucalyptus marginata*; *Banksia attenuata*, *B. menziesii* and *B. ilicifolia* Low Woodland, with scattered *Eucalyptus marginata*, *Melaleuca preissiana* and *Nuytsia floribunda*

Wetlands: *Hypocalymma angustifolium* and *Astartea* aff. *fascicularis* Open Heath with scattered low *Melaleuca preissiana*

Vegetation Condition: >90% Excellent, <10% Very Good (Gibson *et al.* 1994, Trudgen 1990)

Total Flora: 150 (Keighery, GJ, 1996) (estimated >75% expected flora)

Significant Flora: *Boronia crenulata*, *Gyrostemon subnudus* (southernmost population on Swan Coastal Plain, Keighery, GJ, 1996)

Fauna: limited survey by Crook (1980) for birds (25) and mammals (1). Significant bird species: category 3 (3) and category 4 (2)

Linkage: adjacent bushland to the north, east and west

Other Special Attributes: included in Jandakot Botanic Park Proposal (MfP 1995)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Listed on the Register of the National Estate

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, 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 Peel-Harvey Estuary EPP/SPP; location of conservation category wetlands; under MRS Parks and Recreation Reservation and TPS Landscape Zoning, Crown Reserve

Constraints: under General Mineral Resource Area (sand)

Recommendation: The care, control and management of this Bushplan Site (Reserve 28167) for conservation purposes within Jandakot Regional Park is endorsed.

LOWLANDS BUSHLAND — EASTERN BLOCK, PEEL ESTATE

Boundary Definition: bushland (part taken to cadastre) boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 368 **Map no.** 89, 95 **Map sheet series ref. no.** 2033-II NE

System 6 (1983): Part M105 area of bushland goes beyond System area boundaries, all bushland described

Other Names

Lowlands — eastern block; Lowlands

Local Authorities (Suburb)

Shire of Serpentine-Jarrahdale (Mardella)

Area (ha): total 1064.5 (includes open water); bushland 1034.1

Zoning

MRS: Rural

TPS: Rural

Lot/Location/Reserve numbers (Purpose),

Street name

3 Mundijong Rd; 2 Roe Rd; 1 street not identified

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Pinjarra Plain

Guildford Formation (Qpa: Cs, C2) (Qha: Msc1)

Bassendean Dunes

Bassendean Sands (Qpb: S8)

Bassendean Dunes/Pinjarra Plain

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

Wetlands (within the Bassendean Dunes/Pinjarra Plain)

Holocene Swamp Deposits (Qhw: Spc,)

VEGETATION AND FLORA

Vegetation Complexes

Pinjarra Plain

Guildford Complex

Dardanup Complex (most northern occurrence)

Bassendean Dunes

Bassendean Complex — Central and South



Combinations of Bassendean Dunes/Pinjarra Plain

Southern River Complex

Floristic Community Types

Supergroup 2: Seasonal Wetlands

- 4 *Melaleuca preissiana* damplands
- 5 Mixed shrub damplands
- 11 Wet forests and woodlands

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau

- 21a Central *Banksia attenuata* — *Eucalyptus marginata* woodlands
- 21c Low lying *Banksia attenuata* woodlands or shrublands
- 23a Central *Banksia attenuata* — *B. menziesii* woodlands

WETLANDS

Wetland Types: sumpland, palusplain, creek

Natural Wetland Groups

Pinjarra Plain

Keysbrook (P.1)

Bassendean—Pinjarra transition OR Bassendean with fluvial features

Bennett Brook (B/P.4)

Swan Coastal Plain Rivers

Goegrup (R.4)

Wetland Management Objectives: Conservation (16.8ha, 1393m), Resource Enhancement, Multiple Use

Swan Coastal Plain Lakes EPP: 4.9 ha

THREATENED ECOLOGICAL COMMUNITIES

Not assessed

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: open water, vegetated wetland, creek, river, vegetated uplands

Vegetation and Flora: detailed survey (Keighery, BJ, *et al.* 1995); limited survey (Gibson *et al.* 1994 (Rowe 01–02, Low 01, 04, 6a–10b, 12a–14a))

Structural Units: mapping (Keighery, BJ, *et al.* 1995)

Uplands: *Banksia attenuata* and *B. menziesii* Woodlands to Forest with scattered emergent *Eucalyptus marginata* and *E. calophylla* and with *Xylomelum occidentale*, *Allocasuarina fraseriana*, *Banksia grandis* and *B. ilicifolia* being sometimes co-dominants in the *Banksia* layer; *Eucalyptus gomphocephala* Open Forest; *Banksia attenuata*, *B. menziesii* and *Allocasuarina fraseriana* Woodlands to Forests; *Jacksonia sternbergiana* Low Woodland; *Banksia attenuata* and *B. menziesii* Woodland over *Kunzea ericifolia* Closed Tall Scrub

Wetlands: *Melaleuca preissiana*, *Banksia attenuata*, *B. menziesii* and *Allocasuarina fraseriana* Woodland to Forest; *Melaleuca raphiophylla* Low Woodland to Tall Shrubland; *Eucalyptus rudis* Forest to Woodland; Woodlands over Sedgeland, where the dominants may be *Melaleuca preissiana*, *Eucalyptus calophylla* and *E. rudis*

Scattered Native Plants: Areas of *Banksia attenuata* and *B. menziesii*, *Eucalyptus marginata*, *E. rudis* and *E. calophylla* Forest to Woodland occur within areas that have been cleared for pasture — regionally significant vegetation recognised as being included in the area of Bushplan Site in need of protection

Vegetation Condition: >80% Excellent to Very Good, <20% Good to Degraded, with areas of severe localised disturbance

Total Flora: 335 native taxa (Keighery, BJ, *et al.* 1995) (estimated >90% expected flora of BS372 and BS368)

Significant Flora: *Caladenia huegelii* (R), *Drakaea elastica* (R); Keighery, BJ, *et al.* 1995 — *Eryngium pinnatifidum* subsp. *palustre* ms, (2), *Stylidium longitubum* (3), *Dillwynia dillwynioides* (3), *Stylidium mimeticum* (3), *Conostephium minus* (4, southernmost population); *Drosera gigantea* subsp. *geniculata* ms, *Stylidium utricularioides*, *Stylidium roseo-alatum*, *Boronia crenulata*, *Johnsonia* aff. *pubescens* (GJK 5249), *Evandra pauciflora*, *Eucalyptus gomphocephala* (unusual record, normally confined to coastal Quindalup and Spearwood Dunes).

Fauna: multiple surveys by RAOU (1996 D) for birds (88). Good assemblage of insectivorous birds. Significant bird species: Golden Whistler, Yellow Robin and Yellow-plumed Honeyeater. Significant mammal species: Quenda, Western Brush Wallaby, Brush-tailed Wambenger and Water Rat

Linkage: adjacent bushland to the south, east (BS371, canopy) and west; part of proposed Greenway 81 (Tingay, Alan & Associates 1997a); part of a regionally significant fragmented bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes Farm buildings within the property are on the Register of the National Estate; rare example of intact riverine communities (Keighery, BJ, *et al.* 1995); large area of mature *Banksia* Woodland habitat that has not been subject to periodic logging or burning; mature examples of *Eucalyptus marginata*, *Eucalyptus rudis* and *Banksia* species in woodlands; largest privately owned bushland area in the PMR managed for conservation; contains 4820m of regionally significant river (WRC 1996a GIS)



SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Interim List of Register of the National Estate

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Diversity, Rarity, Maintaining ecological processes or natural systems, 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

Opportunities and/or Constraints

Opportunities: Bushplan Site/part Bushplan Site subject to Swan Coastal Plain Lakes EPP, Peel-Harvey Estuary EPP/SPP; location of Declared Rare Flora, conservation category wetlands

Constraints: Bushplan Site private land; under General Mineral Resource Area (clay)

Recommendation: The private ownership and management intent of the Bushplan Site is endorsed. Appropriate mechanisms to support and reinforce existing management for conservation and provide long-term security to be applied in consultation with the land owner(s).

LOWLANDS BUSHLAND — WESTERN BLOCK (HYMUS SWAMP), PEEL ESTATE

Boundary Definition: bushland (part taken to cadastre) boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 372 Map no. 94 Map sheet series ref. no. 2033-II NW
System 6 (1983): Part M105 Part System area bushland, only bushland described

Other Names

White Gum Block; Lowlands — western block;
Lowlands, Hymus Swamp

Local Authorities (Suburb)

Shire of Serpentine-Jarrahdale (Hopeland)

Ownership Categories

Private

Area (ha): total 141.5; bushland 133.6

Zoning

MRS: Rural

TPS: Rural

Lot/Location/Reserve numbers (Purpose),

Street name

807 River Rd

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Bassendean Dunes

Bassendean Sands (Qpb: S8)

Bassendean Dunes/Pinjarra Plain

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

Wetlands (within the Bassendean Dunes/Pinjarra Plain)

Holocene Swamp Deposits (Qhw: Cps)

VEGETATION AND FLORA

Vegetation Complexes

Pinjarra Plain

Dardanup Complex

Bassendean Dunes

Bassendean Complex — Central and South

Combinations of Bassendean Dunes/Pinjarra Plain

Southern River Complex

Floristic Community Types

Supergroup 2: Seasonal Wetlands

11 Wet forests and woodlands

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau

21c Low lying *Banksia attenuata* woodlands or shrublands

WETLANDS

Wetland Types: dampland, palusplain, artificial channel

Natural Wetland Groups

Swan Coastal Plain Rivers

Goegrup (R.4)

Wetland Management Objectives: Conservation (114.6ha), Resource Enhancement, Multiple Use

Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Not assessed

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated wetland, vegetated uplands

Vegetation and Flora: detailed survey (Keighery, BJ, *et al.* 1995); limited survey (Dames and Moore 1988b, Gibson *et al.* 1994 (Hymus 01-06))

Structural Units: mapping (Keighery, BJ, *et al.* 1995)

Uplands: *Banksia attenuata* and *B. menziesii* Woodland over *Kunzea ericifolia* Closed Tall Scrub; *Banksia attenuata* and *B. menziesii* Woodlands to Forest with scattered emergent *Eucalyptus calophylla*; *Banksia attenuata*, *B. ilicifolia*, *Nuytsia floribunda* Low Open Forest

Wetlands: *Melaleuca preissiana*, *M. raphiophylla* Low Woodland; *Melaleuca raphiophylla* Low Woodland to Forest; mixed Herbland; *Restio stenostachyus* Sedgeland

Scattered Native Plants: areas of *Eucalyptus gomphocephala*, *E. rudis* and *E. calophylla* Forest to Woodland occur within areas that have been cleared for pasture — regionally significant vegetation recognised as being included in the area of Bushplan Site in need of protection

Vegetation Condition: >60% Very Good to Excellent, <40% Good to Degraded, with areas of severe localised disturbance

Total Flora: 335 native taxa (Keighery, BJ, *et al.* 1995) (estimated >90% expected flora of BS372 and 368)

Significant Flora: Keighery, BJ, *et al.* 1995 — *Stylidium longitubum* (3), *Dillwynia dillwynioides* (3), *Stylidium mimeticum* (3); *Drosera gigantea* subsp. *geniculata* ms, *Stylidium utricularioides*, *Eucalyptus gomphocephala* (unusual record, normally confined to coastal Quindalup and Spearwood Dunes)

Fauna: no known information

Linkage: adjacent bushland in the south, east and west; part of proposed Greenway 81 (Tingay, Alan & Associates 1997a); part of a regionally significant fragmented bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: mature examples of *Eucalyptus gomphocephala*, *E. rudis*, *Banksia ilicifolia* and *Melaleuca preissiana* in woodlands

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Listed on the Register of the National Estate

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Rarity, 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

Opportunities and/or Constraints

Opportunities: Bushplan Site subject to Peel-Harvey Estuary EPP/SPP; location of conservation category wetlands

Constraints: private land; General Mineral Resource Area (clay)

Recommendation: The private ownership and management intent of the Bushplan Site is endorsed. Appropriate mechanisms to support and reinforce existing management for conservation and to provide long-term security to be applied in consultation with the land owner(s).

BALDIVIS ROAD BUSHLAND, BALDIVIS

Boundary Definition: protected area/bushland (part taken to cadastre/zoning) boundary (Areas of bushland within the boundaries of the Bushplan Site are not accurately mapped.)

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 376 **Map no.** 94, 99, 100 **Map sheet series ref. no.** 2033-II SW, 2033-II NW

Other Names

Karnup Nature Reserve included in Bushplan Site, Part Submission Area 245

Area (ha): total 157.8 (includes open water); bushland 133.0

Local Authorities (Suburb)

City of Rockingham (Baldivis)

Zoning

MRS: Rural, Parks and Recreation, Important Regional Roads

TPS: Rural, Special Rural, Local Roads, Landscape



Ownership Categories

Private, State Government

Lot/Location/Reserve numbers (Purpose),

Street name

1, 2, 41 Karnup Rd; 33, 101 Foster Rd; 200, 201, 1095
Baldivis Rd; 42 Sixty Eight Rd; 212, 213, 214, 215,
216, 217, 218, 219, 220, 221 Wicksteed Cl; 202, 203,
204, 205, 206, 210, 211 Diogenes Ct

Crown Reserve

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Pinjarra Plain

Guildford Formation (Qpa: C2, Mc2)

Bassendean Dunes

Bassendean Sands (Qpb: S8)

Spearwood Dunes

Sands derived from Tamala Limestone (Qts: S7)

VEGETATION AND FLORA

Vegetation Complexes

Pinjarra Plain

Serpentine River Complex

Spearwood Dunes

Karrakatta Complex — Central and South

Floristic Community Types: *not sampled, types inferred (partial coverage)

Supergroup 2: Seasonal Wetlands — not sampled, type not inferred

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau

*21a Central *Banksia attenuata* — *Eucalyptus marginata* woodlands

Supergroup 4: Uplands centred on Spearwood and Quindalup Dunes

*28 Spearwood *Banksia attenuata* or *B. attenuata* — *Eucalyptus* woodlands

WETLANDS

Wetland Types: palusplain

Natural Wetland Groups

Pinjarra Plain

Keysbrook (P.1)

Bassendean Dunes

Gnangara (B.2)

Spearwood Dunes

Stakehill (S.4)

Swan Coastal Plain Rivers

Goegrup (R.4)

Wetland Management Objectives: Multiple Use

Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Not assessed

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated uplands, vegetated wetlands

Vegetation and Flora: limited survey (DEP 1998 part roadside observations)

Structural Units

Uplands: Scattered *Eucalyptus marginata* over Mixed Open Forest of *E. calophylla*, *Allocasuarina fraseriana*, *Banksia attenuata*, *B. menziesii*, *B. grandis*; *Eucalyptus calophylla* Low Open Forest over *Banksia attenuata*, *B. menziesii* and *Allocasuarina fraseriana*; scattered *Eucalyptus calophylla* and *E. marginata* over Low Open Forest over *Banksia attenuata*, *B. menziesii* and *Allocasuarina fraseriana*; *Eucalyptus gomphocephala* Open Woodland

Wetlands: isolated patches of Low Closed Forest dominated by either *Eucalyptus rudis* or *Melaleuca raphiophylla*

Vegetation Condition: >20% Excellent, >40% Very Good, >25% Good, with areas of severe localised disturbance

Total Flora: not known

Significant Flora: not surveyed

Fauna: no known information

Linkage: adjacent bushland to the east and west; part of proposed Greenway 83 (Tingay, Alan & Associates 1997a); part of a regionally significant fragmented bushland/wetland linkage (Volume 2A, Map 8)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, 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 Peel-Harvey Estuary EPP/SPP; under MRS Parks and Recreation Reservation and TPS Landscape Zoning, Crown Reserve

Constraints: private land; under MRD regional road requirements, General Mineral Resource Area (clay)

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s).

HENDERSON ROAD BUSHLAND, PEEL ESTATE

Boundary Definition: bushland (part taken to cadastre) boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 378 **Map no.** 100 **Map sheet series ref. no.** 2033-II SW

Other Names

Submission Area 220

Local Authorities (Suburb)

Shire of Serpentine-Jarrahdale (Hopeland)

Ownership Categories

State Government

Area (ha): total 154.9 (includes open water); bushland 129.1

Zoning

MRS: Rural

TPS: Rural, Public Open Space, Landscape

Lot/Location/Reserve numbers (Purpose),

Street name

2, 399, 400 Henderson Rd; 1 River Rd; 164 Yangedi Rd

Crown Reserve

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Bassendean Dunes

Bassendean Sands (Qpb: S8)

Bassendean Dunes/Pinjarra Plain

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

Wetlands (within the Bassendean Dunes/Pinjarra Plain)

Holocene Swamp Deposits (Qhw: Cps)

VEGETATION AND FLORA

Vegetation Complexes

Bassendean Dunes

Bassendean Complex — Central and South

Combinations of Bassendean Dunes/Pinjarra Plain

Southern River Complex

Floristic Community Types

Supergroup 2: Seasonal Wetlands

4 *Melaleuca preissiana* damplands

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau

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

WETLANDS

Wetland Types: sumpland, dampland, palusplain, artificial channel

Natural Wetland Groups

Bassendean—Pinjarra transition OR Bassendean with fluvial features

Bennett Brook (B/P.4)

Wetland Management Objectives: Conservation (35.3ha), Resource Enhancement, Multiple Use

Swan Coastal Plain Lakes EPP: 3.9ha + 1.3ha = 5.2ha (total)

THREATENED ECOLOGICAL COMMUNITIES

Not assessed



SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: open water, vegetated wetland, vegetated uplands

Vegetation and Flora: limited survey (DEP 1996 (Kailis 01-03), part Bushplan Site — Hart Simpson and Associates 1990, part Bushplan Site — Masters and Associates 1992)

Structural Units

Uplands: *Banksia attenuata* and *B. menziesii* Low Open Forest to Low Woodland

Wetlands: *Melaleuca preissiana* Low Open Woodland

Scattered Native Plants: not assessed

Vegetation Condition: >50% Excellent to Very Good, <50% Good to Completely Degraded, with areas of severe localised disturbance

Total Flora: 89 native taxa (plot-generated list only)

Significant Flora: none recorded

Fauna: no systematic survey. Significant mammal species: Quenda (Friend 1996 D)

Linkage: adjacent bushland to the north, south and east; part of proposed Greenway 140 (Tingay, Alan & Associates 1997a)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, 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 Peel-Harvey Estuary EPP/SPP, Swan Coastal Plain Lakes EPP; location of conservation category wetlands; under TPS Public Open Space Zoning and Landscape Zoning, Crown Reserve

Constraints: private land; Titanium mineralization subject to mining lease applications M70/729 and M70/740 and exploration licences E70/785 and E70/838 (Baxter joint venture)

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s).

YANGEDI SWAMP, KEYSBROOK

Boundary Definition: management/bushland (part to cadastre)/conservation wetland 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. 77 **Map no. 100, 101, 104, 105** **Map sheet series ref. no. 2033-II SE, 2033 II SW**

Other Names

Submission Area 219

Local Authorities (Suburb)

Shire of Serpentine-Jarrahdale (Keysbrook)

Ownership Categories

Private (including commercial organisation)

Area (ha): total 447.283 (includes open water); bushland 364.954

Zoning

MRS: Rural

TPS: Rural, Landscape

Lot/Location/Reserve numbers (Purpose),

Street name

1, 2 Elliott Rd; 2 Hopeland Rd; 77, 80 Yangedi Rd

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Bassendean Dunes

Bassendean Sands (Qpb: S8)

Bassendean Dunes/Pinjarra Plain

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

Wetlands (within the Bassendean Dunes/Pinjarra Plain)

Holocene Swamp Deposits (Qhw: Cps) (Qrw: Sp1, Sp2)

VEGETATION AND FLORA

Vegetation Complexes

Bassendean Dunes

Bassendean Complex — Central and South

Combinations of Bassendean Dunes/Pinjarra Plain

Southern River Complex

Floristic Community Types

Supergroup 2: Seasonal Wetlands

15 Forests and woodlands of deep seasonal wetlands

S1 *Astartea* aff. *fascicularis*/*Melaleuca* species dense shrublands

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau

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

WETLANDS

Wetland Types: sumpland, dampland, palusplain, artificial channel

Natural Wetland Groups

Bassendean—Pinjarra transition OR Bassendean with fluvial features

Bennett Brook (B/P.4)

Wetland Management Objectives: Conservation (51ha), Resource Enhancement, Multiple Use

Swan Coastal Plain Lakes EPP: 5.7ha + 5.5ha = 11.2ha (total)

THREATENED ECOLOGICAL COMMUNITIES

Not assessed, Not determined, Vulnerable (floristic community type 15)

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: open water, vegetated wetland, vegetated uplands

Vegetation and Flora: limited survey (DEP 1996 (Yang 01-03), part Bushplan Site — Hart Simpson and Associates 1990, part Bushplan Site — Masters and Associates 1992)

Structural Units

Uplands: *Banksia attenuata*, *B. menziesii* and *B. ilicifolia* Low Open Forest

Wetlands: *Melaleuca preissiana* Low Open Forest; *Melaleuca uncinata*, *M. viminea* and *M. lateritia* Tall Open

Scrub; *Melaleuca raphiophylla* Low Woodland to Tall Shrubland; *Regelia ciliata* Open Heath; mixed Herbland;

Lepidosperma longitudinale Sedgeland

Scattered Native Plants: within bushland mapped, <20% includes *Eucalyptus rudis* Woodland

Vegetation Condition: >50% Very Good to Excellent, <30% Good to Degraded, with areas of severe localised disturbance

Total Flora: 110 native taxa (plot-generated list only)

Significant Flora: *Stylidium longitubum* (3); *Myriocephalus helichrysoides*, *Stylidium utricularioides*, *Macarthuria apetala* (most southern location)

Fauna: no known information

Linkage: no adjacent bushland

Other Special Attributes: 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 Coastal Plain Lakes EPP, Peel-Harvey Estuary EPP/SPP; location of conservation category wetlands; under TPS Landscape Zoning

Constraints: private land

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s).



2.4 SPEARWOOD DUNES

Part B

2.4 SPEARWOOD DUNES

2.4.1 INTRODUCTION

Location, Landscape and Soils

The Spearwood Dunes are of aeolian origin, being intermediate in age to the older Bassendean Dunes to the east and the younger Quindalup Dunes to the west. This dune system is characterised by a series of limestone-capped 'peaks' such as Reabold Hill, Shire View Hill and Mount Brown, forming the most prominent hills on the Swan Coastal Plain in the Perth Metropolitan Region. The Tamala Limestones, which outcrop on these hills and in other lower rises and hills, are generally overlaid by yellow to brown sands. Low dunes and swales of shallow pale grey sands over yellow sands are also characteristic of the Spearwood Dunes (Table 1.4a&b). The wetlands of the Spearwood Dunes (Table 2.4) are associated with peats and carbonate sands and occasionally clays overlaying sands.

Remnant Bushland on the Spearwood Dunes

While relatively large areas of the Spearwood Dunes remain as bushland, historically, clearing on this dune system has been more widespread than on the Bassendean Dunes. The soils of the Spearwood Dunes are comparatively more fertile than the Bassendean Dunes and have a greater ability to hold nutrients. As a consequence the Spearwood Dunes have been cleared for pine plantations and the areas in and around the wetlands have been a focus for horticulture (principally market gardens). The uncleared dunes have been subject to substantial grazing pressure throughout their range. The inhospitable terrain of the areas with outcropping limestone has protected these areas from grazing. However they are a focus for mining, some hills having been totally removed.

Recent mapping for the Perth Metropolitan Region (Table 3.4) indicates that between 18 per cent and 79 per cent of the vegetation complexes associated with the Spearwood Dunes remain as native vegetation.

Plant Communities and their Conservation on the Spearwood Dunes

At the regional level five vegetation complexes (Table 3.4) are confined to the Spearwood Dunes and two others are, at times, associated with the Spearwood Dunes in the Perth Metropolitan Region. Fifteen floristic community types (Table 4.4) are the principal regional floristic groups identified on the Spearwood Dunes and three of these are considered to be confined to the Perth Metropolitan Region.

Floristic community type 20a (Table 5.4) has been determined a threatened ecological community. A faunal wetland ecological community has also been distinguished as threatened (Table 5.4). This wetland community is associated with the caves around Yanchep.

A Bushplan Site in the Spearwood Dunes was recognised by the EPA as containing 'Threatened or Poorly Reserved Plant Communities' in need of interim protection under the System 6 part System 1 Update (EPA 1994 GIS). This Site (Bushplan Site 293) contains an area of floristic community type 26a and was identified by Gibson et al. (1994). Weston and Gibson (1997) have recommended that floristic community type 26a be determined a threatened ecological community.

A large variety of vegetation associations has been identified on the Spearwood Dunes. As areas with exposed limestone (Tamala Limestones after Table 1.4a) support a distinctive suite of vegetation associations, the Spearwood Dunes vegetation associations are considered under two headings. The Bushplan Site descriptions follow this format.


Sands derived from Tamala Limestones

Uplands

The main upland associations are forests to open woodlands associated with a diverse understorey (Table 4.4) and shrublands. These broad units and associated dominant species are:

Open Forests and Woodlands

Eucalypts — *Eucalyptus marginata*, *E. gomphocephala*, *E. decipiens*
Sheoaks — *Allocasuarina fraseriana*



Banksias — *Banksia attenuata*, *B. menziesii*, *B. prionotes*, *B. grandis*

Shrublands

Daviesia triflora, *D. nudiflora*, *D. decurrens*, *Leucopogon propinquus*, *Hardenbergia comptoniana*, *Phyllanthus calycinus*, *Conostephium pendulum*, *Gompholobium tomentosum*, *Melaleuca acerosa*, *Hibbertia hypericoides*, *H. racemosa*, *Xanthorrhoea preissii*, *Macrozamia riedlei*

Herblands

Burchardia congesta, *Lomandra maritima*, *Sowerbaea laxiflora*, *Conostylis aculeata*, *C. setigera*, *Daucus glochidiatus*, *Dianella revoluta*

Sedgelands

Schoenus grandiflorus, *Mesomelaena pseudostygia*, *Loxocarya flexuosa*, *Lepidosperma angustatum*

Grasslands

Austrostipa flavescens, *Austrodanthonia occidentalis*

Wetlands

The main wetland associations are forests to woodlands (Table 4.4) and sedgelands. These broad units and associated dominant species are:

Open Forests and Woodlands

Eucalypts — *Eucalyptus calophylla* (wetland margins), *E. rudis*, *E. gomphocephala*
Banksias — *Banksia littoralis*

Sedgelands

Baumea articulata, *B. juncea*, *Lepidosperma longitudinale*, *Gahnia trifida*, *Juncus pallidus*

Tamala Limestones

Uplands

The main upland associations are mallees, scrubs, shrublands and heaths dominated by a variety of shrubs interleaved with herbs and sedges. These broad units and associated dominant species are:

Mallees

Eucalyptus argutifolia, *E. foecunda*, *E. petrensis*

Shrublands

Leucopogon parviflorus, *Dryandra sessilis* var. *cygnorum*, *D. lindleyana* subsp. *lindleyana*, *Trymalium ledifolium* subsp. *ledifolium*, *Grevillea preissii*, *Hakea trifurcata*, *Templetonia retusa*,

Gompholobium tomentosum, *Melaleuca acerosa*, *M. huegelii*, *Hibbertia spicata* subsp. *leptotheca*, *Acacia truncata*, *A. lasiocarpa* var. *lasiocarpa*

Herblands

Opercularia vaginata

Sedgelands

Loxocarya flexuosa, *Lepidosperma angustatum*

Grasslands

Austrostipa flavescens, *Austrodanthonia occidentalis*

Wetlands are not typically associated with outcropping limestone. However, a wetland community has been identified on the Tamala Limestone coastal cliffs (Bushplan Site 346, floristic community type 16).

Thirty-seven significant taxa are associated with the Spearwood Dunes in the Perth Metropolitan Region (Table 6.4). These include two species of Declared Rare Flora and 11 of Priority Flora. A number of taxa are confined to the Spearwood Dunes, two of these, *Hibbertia spicata* subsp. *leptotheca* and *Jacksonia sericea*, being endemic to the Perth Metropolitan Region.

Twelve significant taxa are associated with shallow soils over outcropping Tamala Limestone (Table 6.4, after Keighery, GJ, 1990a and Griffin 1993). Other taxa not listed in Table 6.4 also show the same ecological preferences, for example: *Caladenia longicauda* subsp. *calcigena* ms, *Conostylis pauciflora* subsp. *euryrhipes*, *Rhagodia baccata* subsp. *dioica*, *Grevillea crithmifolia*, *G. preissii*, *Petrophile serruriae* subsp. nov., *Nemcia reticulatum*, *Beyeria cygnorum*, *Alyogyne huegelii* var. *glabrata*, *Trymalium ledifolium* subsp. *ledifolium*, *Diplopeltis huegelii* var. *huegelii*, *Diplolaena angustifolia*, *Baeckea robusta*, *Hemiandra pungens*, *Hemigenia barbata*, *Stylidium bulbiferum* and *S. junceum*. Interestingly some of these taxa have closely related taxa or forms of the same taxa on the eastern side of the Plain and the Darling Scarp (see section 2.2).

Part B

Table 1.4a: Geological and geomorphological systems of the Spearwood Dunes. The general terms used in Perth's Bushplan for describing the major landform elements are in **bold italics**.

Major Geological Systems (after Playford et al. 1976)	Major Geomorphological Systems (after McArthur and Bettenay, 1960)	Detailed Geomorphological Units (after Churchward and McArthur, 1980)
Tamala Limestone and sands derived from Tamala Limestone	Spearwood Dunes	Cottesloe Karrakatta
Wetlands (within the Guildford Formation, Bassendean Sand, Tamala Limestone)	Not applicable	Herdsmen
Lagoonal and estuarine deposits (within the Guildford Formation, Bassendean Sand, Tamala Limestone)	Not applicable	Yoongarillup

Combined here under Spearwood Dunes for major landform elements, see Volume 2, Part A, Tables 1 and 2; Vasse combined under Pinjarra Plain for major landform elements, see 2.2 FOOTHILLS AND PINJARRA PLAIN

Table 1.4b: Landform and soils of the Spearwood Dunes showing the relationship between geomorphological systems, units identified in the Environmental Geology Maps and soils described on these maps on the Swan Coastal Plain in the Perth Metropolitan Region. Column One can be used to cross-reference to groups shown in Table 1a.

Major Geomorphological Systems (after McArthur and Bettenay, (1960); *Detailed Geomorphological Units (after Churchward and McArthur, 1980)	Major Units in the Environmental Geology Maps (after various authors)	Soils associated with each unit
Spearwood Dunes; *Cottesloe, Karrakatta, #Yoongarillup	Sands derived from Tamala Limestone Tamala Limestone	pale grey to pale yellow sands; limestone and associated light yellowish brown sands, silts, sands and calcareous deposits in various associations
Wetlands – within the Pinjarra Plain, Bassendean Dunes, Spearwood Dunes, Quindalup Dunes; *Herdsmen	Holocene swamp deposits	peats associated with clays, sands and silts in various proportions

Combined here under Spearwood Dunes for major landform elements, see Volume 2, Part A, Tables 1 and 2

Table 2.4: Natural Wetland Groups (Consanguineous Suites) on the Spearwood Dunes
(after Semeniuk, 1996)

Name & locations	Geomorphic setting	Primary wetlands	Stratigraphy	Origin of wetlands
Spearwood Dunes				
Yanchep suite (S1) Between Yanchep to the north & Kingsley to the south in a linear belt about 5km inland from the coast	Spearwood Dunes Unit – area of parallel, coastal dune ridges, up to 40-60m above MSL, & associated segmented depressions	Lakes & sumplands	Thin layer of peat overlying grey to yellow sand	Wetlands occur in depressions between limestone ridges fed by discharge from limestone & groundwater table rise; basins are young karst features
Balcatta suite (S2) In a 5 x 10km area north of the Swan River estuary about 3km inland from the coast	Spearwood Dunes Unit/area of hills & depressions within the limestone dune ridges	Sumplands (& lakes subsequent to clearing of vegetation eg. Carine Swamp)	Variable: peat overlying yellow sand, to peat & clay overlying thick yellow sand	Wetlands occur in depressions between hills; possibly old (mature) karst features
Coogee suite (S3) In a linear belt 1-2km inland from the coast, east of Woodman Point	Spearwood Dunes Unit – inter dune ridge depression overlying limestone	Lakes & sumplands	Carbonate mud overlying limestone	Carbonate mud filled depressions now acting to pond meteoric water
Stakehill suite (S4) Linear belt extending from Wattleup to Mandurah	Spearwood Dunes Unit – ranging from ridges of limestone outcropping to ridges of yellow sand overlying limestone	Lakes & sumplands	Carbonate mud & peat overlying yellow sand	Carbonate mud & peat filled depressions; probably originally karst depressions superimposed on palaeotopographic features
Spearwood – Bassendean Dunes Interface				
Bibra suite (SB1) 1. Linear belt extending south from Bidaminna to Caladenia Cave 2. Linear belt extending from Murdoch to Wellard, in a N/S orientation approximately 5-7km east of the coast	Spearwood Dunes & Bassendean Dunes contact depression. Continuous high dune ridges to the west & a series of discontinuous hollows & hills with lower relief to the east.	Lakes & sumplands in a north-south oriented chain	Mud, peat, or peaty sand overlying Bassendean Sand	Contact depressions with groundwater impounded against Spearwood Dune ridge

Part B

Table 3.4: Vegetation complexes (Heddie *et al.*, 1980) and percentage remaining as native vegetation (AgWA 1998 GIS) on the Spearwood Dunes in the Perth Metropolitan Region

Vegetation Complex	Native Vegetation (%)
Spearwood Dunes	
KARRAKATTA COMPLEX – NORTH: Predominantly low open forest and low woodland of <i>Banksia</i> species <i>Eucalyptus totidiana</i> , less consistently open forest of <i>E. gomphocephala</i> – <i>E. totidiana</i> – <i>Banksia</i> species	20
KARRAKATTA COMPLEX – NORTH – TRANSITION VEGETATION COMPLEX: A transition complex of low open forest and low woodland of <i>Banksia</i> species – <i>Eucalyptus totidiana</i> on the transition zone of a series of high sand dunes between Bassendean-North and Karrakatta-North.	79
KARRAKATTA COMPLEX – CENTRAL AND SOUTH: Predominantly open forest of <i>Eucalyptus gomphocephala</i> – <i>E. marginata</i> – <i>E. calophylla</i> and woodland of <i>E. marginata</i> – <i>Banksia</i> species	18
COTTESLOE COMPLEX – NORTH: Predominantly low open forest and low woodland of <i>Banksia attenuata</i> – <i>B. menziesii</i> – <i>Eucalyptus totidiana</i> ; closed heath on the limestone outcrops.	70
COTTESLOE COMPLEX – CENTRAL AND SOUTH: Mosaic of woodland of <i>Eucalyptus gomphocephala</i> and open forest of <i>E. gomphocephala</i> – <i>E. marginata</i> – <i>E. calophylla</i> ; closed heath on the limestone outcrops.	36
Wetlands	
HERDSMAN COMPLEX: Sedgeland and fringing woodland of <i>Eucalyptus rudis</i> – <i>Melaleuca</i> species	31
Marine (lagoonal and estuarine) Deposits	
YOONGARILLUP COMPLEX: Woodland to tall woodland of <i>Eucalyptus gomphocephala</i> with <i>Agonis flexuosa</i> in the second storey. Less consistently an open forest of <i>E. gomphocephala</i> – <i>E. marginata</i> – <i>E. calophylla</i> .	72

Table 4.4: Floristic community types identified on the Spearwood Dunes (after Gibson *et al.*, 1994 and DEP 1996)

Key

Column 1: Floristic Community Type Codes

The numbers of the types additional to Gibson *et al.* (1994) are italicised if they are subsets of an existing group (in types 19, 20, 23 and 30) and italicised and preceded by 'S' if they are supplementary groups.

Column 2: General Description of Floristic Community Types

Descriptions are based on generalised information from all plots in the group. Structural units are categorised into forest, woodlands, shrublands, sedgelands and herblands after Gibson *et al.* (1994).

Column 3: Average Species Richness per Floristic Community Type

Average species richness per 10x10m plot less those species only occurring in a single plot. Some community types can have a high proportion of single records. Thus these estimates of average species richness are underestimates in some cases.

Supergroup 2 – Seasonal Wetlands		
11	Wet forests and woodlands	28.0
13	Deeper wetlands on heavy soils	16.9
14	Deeper wetlands on sandy soils	16.5
16	Highly saline seasonal wetlands	11.2
17	<i>Melaleuca raphiophylla</i> – <i>Gahnia trifida</i> seasonal wetlands	13.4
S7	Northern woodlands to forests over tall sedgelands alongside permanent wetlands	17.7



Table 4.4: (continued)

Supergroup 3 – Uplands centred on Bassendean Dunes and Dandaragan Plateau	
20a	<i>Banksia attenuata</i> woodlands over species rich dense shrublands 64.5
21a	Central <i>Banksia attenuata</i> – <i>Eucalyptus marginata</i> woodlands 52.0
59	<i>Banksia attenuata</i> woodlands over dense low shrublands 38.9
Supergroup 4 – Uplands centred on Spearwood and Quindalup Dunes	
24	Northern Spearwood shrublands and woodlands 38.9
25	Southern <i>Eucalyptus gomphocephala</i> – <i>Agonis flexuosa</i> woodlands 48.1
26a	<i>Melaleuca huegellii</i> – <i>M. acerosa</i> shrublands of limestone ridges 49.6
26b	Woodlands and mallees on limestone 49.8
27	Species poor mallees and shrublands on limestone 37.3
28	Spearwood <i>Banksia attenuata</i> or <i>B. attenuata</i> – <i>Eucalyptus</i> species woodlands 55.1

Table 5.4: Threatened ecological communities (English and Blyth, 1997) on the Spearwood Dunes

KEY

- CR Critically Endangered
- EN Endangered
- VU Vulnerable

A. Floristic Community Types

Supergroup 3 – Uplands centred on Bassendean Dunes and Dandaragan Plateau

20a	<i>Banksia attenuata</i> woodlands over species rich dense shrublands	EN
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B: Restricted floristic community type mosaics (not applicable)

C: Freshwater communities

	Aquatic root mat community of caves of the Swan Coastal Plain (Jasinska 1991, Jasinska and Knott 1995)	CR
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Part B

Table 6.4: Significant flora of the Spearwood Dunes in the Perth Metropolitan Region

Key

Column 1 Taxon

Names follow Gibson et al. (1994) unless indicated otherwise. Taxa yet to be named have an attached reference collection number from the relevant collector. An 'ms' after the name indicates that this is a manuscript name which is yet to be published.

Column 2 Major landform elements

- DS = Darling Scarp
- D = Dandaragan Plateau
- F = Foothills
- P = Pinjarra Plain
- B = Bassendean Dunes
- S = Spearwood Dunes
- Q = Quindalup Dunes
- R = Estuaries, Rivers and Creeks
- int = interface of two units
- (ML) = Muchea Limestones
- (TL) = Tamala Limestones

Column 3 Taxa dependent on seasonal waterlogging or inundation

- W = depends on waterlogging or inundation of area
- W (aquatic) = depends on standing water

Column 4 Conservation status (Atkins 1998)

- R = Declared Rare Flora
- 1 = Priority 1: Poorly Known Taxa
- 2 = Priority 2: Poorly Known Taxa
- 3 = Priority 3: Poorly Known Taxa
- 4 = Priority 4: Rare Taxa

Column 5 Regional ecological preferences

- e = taxa endemic to the Swan Coastal Plain
- E = taxa endemic to the Swan Coastal Plain in the Perth Metropolitan Region

Geographical Variation

- r = populations at the northern or southern limit of their known geographic range
- d = populations disjunct from their known geographic range
- p = considered to be poorly reserved (applies to all Declared Rare Flora and Priority taxa)
- s = significant populations (applies to all Declared Rare Flora and Priority taxa)
- X = considered lost in the Perth Metropolitan Region

Taxon	Major landform element	Wetland taxa	DRF/ Priority code	Significance code
<i>Acacia alata</i> var. <i>tetrantha</i>	S (TL)			s
<i>Acacia benthamii</i>	S/B		2	p, s, E
<i>Acacia littorea</i>	S/Q			d
<i>Alyogyne huegelii</i> var. <i>glabrata</i>	Q/S			s
<i>Astroloma macrocalyx</i>	S/F/D			s, p
<i>Astroloma microcalyx</i>	S/Q			s
<i>Boronia purdieana</i>	S/B			r
<i>Carpobrotus modestus</i>	Q/S			s
<i>Conospermum triplinervium</i>	S/B/P			s, p
<i>Conostylis aculeata</i> subsp. <i>cygnorum</i>	S/B			e
<i>Craspedia</i> sp. (JPT 277)	S			s
<i>Diplolaena angustifolium</i>	Q/S			p
<i>Diuris micrantha</i>	S	W	R	p, s

Table 6.4: (continued)

<i>Eucalyptus argutifolia</i>	S	R	p, s
<i>Eucalyptus foecunda</i>	S		p
<i>Eucalyptus mundijongensis</i> (hybrid)	S/F	1	p, s
<i>Eucalyptus petrensis</i>	S		p, s
<i>Glischrocaryon aureum</i>	S/B/F		p
<i>Haloragis aculeolata</i>	S (TL)/ P (ML)	2	p, s, e
<i>Hibbertia spicata</i> subsp. <i>leptotheca</i>	S (TL)	3	p, s, E
<i>Jacksonia sericea</i>	S	3	p, s, E
<i>Kennedia coccinea</i>	Q/S (TL)		s
<i>Lasiopetalum membranaceum</i>	S/Q	2	p, s
<i>Lechenaultia linarioides</i>	S/Q		p
<i>Lepidium pseudohyssopifolium</i>	S	1	p, s, d
<i>Lepidium pseudotasmanicum</i>	S	4	X
<i>Melaleuca cardiophylla</i>	S (TL)		r
<i>Melaleuca lanceolata</i>	Q/S		d, s
<i>Melaleuca</i> sp. Yanchep (GJK 11242)	S (TL)	2	p, s, e
<i>Pimelea calcicola</i>	S (TL)		s
<i>Sarcozona bicarinata</i> (<i>Carpobrotus</i> sp. Hepburn (GJK 11518))	S/Q	3	p, s, e
<i>Senecio ramosissimus</i>	S (TL)	W	r
<i>Schoenus latitans</i>	S (TL)		r, p
<i>Stylidium maritimum</i>	S (TL)/Q	3	p, s, e
<i>Trachymene coerulea</i>	S (TL)/P		s
<i>Veronica</i> aff. <i>calycina</i> (BJK & NG 235)	S		s, p
<i>Wilsonia humilis</i>	S (TL)		p

SPEARWOOD DUNES

2.4.2 DESCRIPTIONS

Bushplan Site No.	Bushplan Map No.	System 6	Bushplan Site Name	Page No.
284	7, 8, 13	M1	South-West Link from Wilbinga to Yanchep National Park	245
396	8, 13, 14		East Link from Wilbinga to Yanchep National Park	246
127	8, 13		State Forest 65 — Yanchep Plantation Bushland, Yanchep	247
128				
288	13, 14, 17, 18	M3	Yanchep National Park and Adjacent Bushland	248
381	8, 9, 13, 14, 15, 18	M4	Ridges and Adjacent Bushland, Yanchep/Nowergup	250
1	14, 15, 18, 19		State Forest 65 — Pinjar Plantation Central Bushland, Yanchep	252
408				
409				
410				
411				
414				
415				
129	18		Bernard Road Bushland, Carabooda	253
130	18		Link between Yanchep and Neerabup National Parks	254
290	19, 26		Hopkins Road Bushland, Nowergup	255
95	19, 26		State Forest 65 — Pinjar Plantation South Bushland, Nowergup/Yanchep/Neerabup	257
134				
135				
136				
137				
139				
140				
417				
425				
428				
444				
446				
451				
455				
457				
383	18, 25, 26, 31, 32	M6	Neerabup National Park, Lake Gnowergup Nature Reserve and Adjacent Bushland, Neerabup	258
384	25, 26, 32	M6	Neerabup Lake and Adjacent Bushland, Neerabup	260
293	26		Shire View Hill and Adjacent Bushland, Nowergup/Neerabup	261
295	26, 27, 32	M8	Flynn Drive Bushland, Neerabup	263
443	33		Little Coogee Flat, Pinjar	264
299	32, 38, 39, 44, 45	M7	Yellagonga Regional Park, Wanneroo/Woodvale/Kingsley	265
164	32		Conti Road Bushland, Wanneroo	267
469	32		Caporn Street Bushland, Mariginiup	268
470	33		Garden Park Bushland, Wanneroo	269
471	39		High Road Bushland, Wanneroo	270
147	32, 33	M8	Mariginiup Lake and Adjacent Bushland, Mariginiup	271
407	38	M7	Woodvale Nature Reserve, Woodvale	273
303	38, 44		Whitfords Avenue Bushland, Craigie/Padbury	274
39	38, 44		Shepherds Bush Reserve, Kingsley	275
327	39	M8	Badgerup Lake and Adjacent Bushland, Wanneroo	276
463	39		Starlight Grove Bushland, Gngangara/Wangara	278
328	45	M12	Decourcey Way Bushland, Marangaroo	279

PART B DESCRIPTIONS

Bushplan Site No.	Bushplan Map No.	System 6	Bushplan Site Name	Page No.
199	45		Landsdale Road Bushland, Landsdale	280
202	44, 45	M11	Warwick Open Space	281
201	45, 46		Koondoola Open Space	282
204	44	M35	Star Swamp Reserve and Adjacent Bushland, North Beach/Waterman	284
203	44	M37	Carine Swamps, Carine	285
212	44, 49	M39	Lake Gwelup Reserve, Gwelup	287
385	45, 46		Reid Highway Bushland, Mirrabooka/Malaga	288
43	50		Cottonwood Crescent, Dianella	289
281	49, 50	M43	Herdsmen Lake	290
312	49, 55	M47	Bold Park and Adjacent Bushland, City Beach	292
119	55		Underwood Avenue Bushland, Shenton Park	294
218	55		Shenton Bushland, Shenton Park	295
317	56	M49	Kings Park	296
220	55	M48	Lake Claremont, Claremont/Swanbourne	297
226	60	M63	Harry Sandon Park, Attadale	298
336	661	M64	Wireless Hill Park, Ardross	299
59	66	M72	Sir Frederick Samson Park, Samson	301
247	66	M92	Manning Lake and Adjacent Bushland, Hamilton Hill/Spearwood	302
429	66, 73	M92	Market Garden Swamps, Spearwood/Munster	303
435				
261	73	M92	Lake Coogee and Adjacent Bushland, Munster	304
346	73, 80	M91 M92	Brownman Swamp, Mt Brown Lake and Adjacent Bushland, Henderson/Naval Base	306
267	81		Mandogalup Road Bushland, Hope Valley	308
272	88		Sicklemore Road Bushland, Parmelia/Casuarina	309
67	80, 87, 88		Parmelia Avenue Bushland, Parmelia	310
349	93, 99	M104	Leda and Adjacent Bushland, Leda	311
275	93, 99		Stakehill Swamp, Baldivis	313
75	99		Churcher Swamp, Baldivis	314
278	99		Cassia Drive Bushland, Karnup	316
379	99		Anstey Swamp, Karnup	317
395	99, 103		Paganoni Swamp and Adjacent Bushland, Karnup	318

SOUTH-WEST LINK FROM WILBINGA TO YANCHEP NATIONAL PARK

Boundary Definition: protected area boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 284 **Map no.** 7, 8, 13 **Map sheet series ref. no.** 2034-IV NE, 2035-III, 2035-III SW

System 6 (1983): Part M1 part System area bushland, only bushland described

Other Names: not known **Area (ha):** total 629.4; bushland 550.6

Local Authorities (Suburb)
Shire of Wanneroo (Two Rocks)

Zoning
MRS: Parks and Recreation
TPS: Landscape

Ownership Categories
State Government, Private (commercial organisation)

Lot/Location/Reserve numbers (Purpose), Street name
203, 401 Mitchell Pl; 201, 202 street not identified

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Spearwood Dunes

Sands derived from Tamala Limestone (Qts: S7)

Tamala Limestone (Qtl: LS2)

Quindalup Dunes (Holocene Dunes)

Safety Bay Sands (Qhs: LS4)

VEGETATION AND FLORA

Vegetation Complexes

Spearwood Dunes

Cottesloe Complex — North

Quindalup Dunes

Quindalup Complex

Floristic Community Types

Supergroup 4: Uplands centred on Spearwood and Quindalup Dunes

26b Woodlands and mallees on limestone

28 Spearwood *Banksia attenuata* or *B. attenuata* — *Eucalyptus* woodlands

29b *Acacia* shrublands on taller dunes

WETLANDS

No wetlands mapped

THREATENED ECOLOGICAL COMMUNITIES

Not assessed

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: tall dune, vegetated uplands

Vegetation and Flora: limited survey (DEP 1996 (Tokyu 02-04); Tingay, Alan & Associates 1991c)

Structural Units

Uplands- Sands derived from Tamala Limestone: *Banksia attenuata*, *B. menziesii* and *Eucalyptus todtiana* Open Forest; *Eucalyptus gomphocephala* Woodland

Uplands- Tamala Limestone: *Melaleuca acerosa*, *Calothamnus quadrifidus* and *Gompholobium tomentosum* Open Low Heath

Safety Bay Sands (oldest dunes): Mixed Open Low Heath

Scattered Native Plants: *Eucalyptus gomphocephala* Woodland to Open Forest

Vegetation Condition: >75% Very Good to Excellent, <25% Good

Total Flora: not surveyed

Significant Flora: *Eucalyptus argutifolia* (R)

Fauna: structured survey by Tingay, Alan & Associates (1991b) of a larger area incorporating this site recorded birds (66), native mammals (6), reptiles (24) and amphibians (3). Significant bird species in the larger area: category 1 (1), category 3 (10) and category 4 (9). Significant mammal species in the larger area: Coastal Dunnart, Honey Possum and Western Brush Wallaby

Linkage: adjacent bushland to the north (BS406), south, east and west (south and east through bushland to BS396 and BS288); part of proposed Greenways 37, 2 (Tingay, Alan & Associates 1997a); part of a regionally significant contiguous bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: Recommended for protection in the study of City of Wanneroo bushland (Trudgen 1996)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed, Indicative Place of the Register of the National Estate

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Rarity, Maintaining ecological processes or natural systems
Opportunities and/or Constraints

Opportunities: Bushplan Site/part Bushplan Site location of Declared Rare Flora; under MRS Parks and Recreation Reservation and TPS Landscape Zoning

Constraints: private land

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s). This Bushplan Site is already reserved for Parks and Recreation in the Metropolitan Region Scheme — it should be made a reserve with a conservation purpose.

EAST LINK FROM WILBINGA TO YANCHEP NATIONAL PARK

Boundary Definition: protected area with bushland/bushland boundary (PMR boundary to the north) (large remnant within pine plantation)

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 396 **Map no.** 8, 13, 14 **Map sheet series ref. no.** 2034-IV NE, 2035-III SE

Area (ha): total 484.4; bushland 480.5

Other Names

Part State Forest 65

Local Authorities (Suburb)

Shire of Wanneroo (Two Rocks, Yanchep), Shire of Gingin (Wilbinga)

Ownership Categories

Private (including commercial organisation), State Government, Not identified

CALM Managed Land

Zoning

MRS: State Forests, Controlled Access Highways

TPS: Landscape

Lot/Location/Reserve numbers (Purpose), Street name

5611 Wanneroo Rd; 400, 5611 street not identified

State Forest 65

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Spearwood Dunes

Sands derived from Tamala Limestone (Qts: S7)

Tamala Limestone (Qtl: LS1, LS2)

VEGETATION AND FLORA

Vegetation Complexes

Spearwood Dunes

Cottesloe Complex — North

Floristic Community Types: *not sampled, type inferred

Supergroup 4: Uplands centred on Spearwood and Quindalup Dunes

*24 Northern Spearwood shrublands and woodlands

*28 Spearwood *Banksia attenuata* or *B. attenuata* — *Eucalyptus* woodlands

WETLANDS

No wetlands mapped

THREATENED ECOLOGICAL COMMUNITIES

Not assessed

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated uplands

Vegetation and Flora: only broad regional information is generally given for Bushplan Site descriptions for remnants in pine plantation

Vegetation Condition: 90% Excellent, <10% Very Good, with areas of severe localised disturbance

Total Flora: not known

Significant Flora: none recorded

Fauna: no known information

Linkage: adjacent bushland to the north (BS406), south (BS288), east (BS381), west; part of a regionally significant contiguous bushland/wetland linkage (Volume 2A, Map 8)



Other Special Attributes: majority recommended for protection in the study of City of Wanneroo bushland (Trudgen 1996); included in Gnangara Park proposal (Bailey 1997)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Maintaining ecological processes or natural systems

Opportunities and/or Constraints

Opportunities: Bushplan Site/part Bushplan Site subject to Gnangara Mound Crown Land EPP; under TPS Landscape Zoning

Constraints: under MRD regional road requirements, General Mineral Resource Area (limestone)

Recommendation: The existing care, control and management of this Bushplan Site is endorsed. This site lies within the proposed 'Gnangara Park' (concept announced by Cabinet in 1996) within which areas of remnant native vegetation, such as this Bushplan Site, should be managed in the future to retain and enhance their conservation values.

STATE FOREST 65 — YANCHEP PLANTATION BUSHLAND, YANCHEP

Boundary Definition: protected area with bushland boundary (remnants within pine plantation)

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 127, 128 **Map no.** 8, 13 **Map sheet series ref. no.** 2035-III SE, 2034-IV NE

Other Names: not known

Area (ha): total 8.1; bushland total 8.1 (2 remnants, from 1.8 to 6.3 ha)

Local Authorities (Suburb)

Shire of Wanneroo (Yanchep)

Zoning

MRS: State Forests

TPS: Landscape

Ownership Categories

State Government

Lot/Location/Reserve numbers (Purpose),

Street name

5611 street not identified

State Forest 65

CALM Managed Lands

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Spearwood Dunes

Sands derived from Tamala Limestone (Qts: S7)

Tamala Limestone (Qtl: LS1)

VEGETATION AND FLORA

Vegetation Complexes

Spearwood Dunes

Cottesloe Complex — North

Floristic Community Types: not sampled, types not inferred

Supergroup 4: Uplands centred on Spearwood and Quindalup Dunes

WETLANDS

No wetlands mapped

THREATENED ECOLOGICAL COMMUNITIES

Not determined

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated uplands

Vegetation and Flora: only broad regional information is generally given for Bushplan Site descriptions for combined remnants in pine plantation

Vegetation Condition: Very Good (Connell 1995)

Total Flora: not known

Significant Flora: none recorded

Fauna: no known information

Linkage: no adjacent bushland

Other Special Attributes: included in Gnangara Park proposal (Bailey 1997)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Criteria not relevant to determination of conservation value, but which may be applied when evaluating areas having similar values

Opportunities and/or Constraints

Opportunities: Bushplan Site subject to Gngangara Mound Crown Land EPP; under TPS Landscape Zoning

Recommendation: The existing care, control and management of this Bushplan Site is endorsed. This site lies within the proposed Gngangara Park (concept announced by Cabinet in 1996) within which areas of remnant native vegetation, such as this Bushplan Site, should be managed in the future to retain and enhance their conservation values.

YANCHEP NATIONAL PARK AND ADJACENT BUSHLAND

Boundary Definition: protected area/bushland boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 288 **Map no. 13, 14, 17, 18** **Map sheet series ref. no. 2034-IV NE**

System 6 (1983): M3 area of bushland goes beyond System area boundaries, all bushland described

Other Names

Loch McNess System

Local Authorities (Suburb)

Shire of Wanneroo (Yanchep, Two Rocks, Carabooda, Eglinton)

Ownership Categories

State Government, Private (commercial organisation),
Not identified

Area (ha): total 2896.7 (includes open water); bushland 2706.7

Zoning

MRS: Urban Deferred, Parks and Recreation, State Forests, Rural, Controlled Access Highways

TPS: Rural, Landscape

Lot/Location/Reserve numbers (Purpose), Street name

11, 16, 55, 56, 57, 58, 59, 60, M1503, 12249 Pipidiny Rd; 8240 Yanchep Beach Rd; 307 Shearwater Ave; 106, 107, 313, 314 Mitchell Fwy; 317 Mitchell Pl; 104, 11544, 11545 street not identified

Crown Reserve

Reserve 9868 (National Park), 29246 (Forest Department Headquarters)

CALM Managed Land

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Spearwood Dunes

Sands derived from Tamala Limestone (Qts: S7)

Tamala Limestone (Qtl: LS1, LS2)

Quindalup Dunes (Holocene Dunes)

Safety Bay Sands (Qhs: LS4)

Wetlands (within the Spearwood Dunes)

Holocene Swamp Deposits (Qhw: Cps)

VEGETATION AND FLORA

Vegetation Complexes

Spearwood Dunes

Cottesloe Complex — North (one of two most northern occurrences)

Cottesloe Complex — Central and South

Quindalup Dunes

Quindalup Complex

Wetlands

Herdsmen Complex (most northern occurrence)

Floristic Community Types: *not sampled, types inferred

Supergroup 2: Seasonal Wetlands

*19b Woodlands over sedgelands in Holocene dune swales

(equivalent to 19 Gibson *et al.* 1994, English and Blyth 1997)

S7 Northern woodlands to forests over tall sedgelands alongside permanent wetlands

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau

23c North-eastern *Banksia attenuata* — *B. menziesii* woodlands

Supergroup 4: Uplands centred on Spearwood and Quindalup Dunes

26a *Melaleuca huegelii* — *M. acerosa* shrublands of limestone ridges

26b Woodlands and mallees on limestone

- *27 Species poor mallees and shrublands on limestone
- 28 Spearwood *Banksia attenuata* or *B. attenuata* — *Eucalyptus* woodlands
- 30b Quindalup *Eucalyptus gomphocephala* and/or *Agonis flexuosa* woodlands (outlier, most occurrences Bunbury and south)

WETLANDS

Wetland Types: lake, sumpland, river, artificial channel

Natural Wetland Groups

Spearwood Dunes

Yanchep (S.1)

Wetland Management Objectives: Conservation (272.8ha, 829.6m), Resource Enhancement

Swan Coastal Plain Lakes EPP: 267.2ha

THREATENED ECOLOGICAL COMMUNITIES

Not assessed, Not determined, Critically Endangered (Aquatic mat community of the Swan Coastal Plain), Critically Endangered (floristic community type 19, as defined by Gibson *et al.* 1994)

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: limestone ridge, tall dune, open water, vegetated wetland, vegetated uplands

Vegetation and Flora: detailed survey (Keighery, GJ, 1993b), limited survey (part Bushplan Site — CALM 1989, Ecologia 1997; EPA and WAWA 1990, Gibson *et al.* 1994 (Yan 01-03), Griffin 1994 (Yan 2, 4-6), Keighery, GJ, 1996 D (Pip 01), McComb and McComb 1967, Weston and Gibson 1997 (R1); WAWA 1995)

Structural Units: mapping (CALM 1989, Ecologia 1997; EPA and WAWA 1990; McComb and McComb 1967; Smith 1989)

Spearwood Dunes

Uplands - Sands derived from Tamala Limestone: *Eucalyptus gomphocephala* Open Forest to Woodland; *Eucalyptus marginata* Open Forest to Woodland — both generally over or mixed with *Banksia* Low Open Forest and Low Woodland and often with *Eucalyptus calophylla* or *Allocasuarina fraseriana*; *Banksia attenuata* and *B. menziesii* Low Open Forest to Low Woodland, often with *Allocasuarina fraseriana*, *Eucalyptus marginata*, *E. todiana*, *Banksia grandis* or *Nuytsia floribunda*

Uplands - Tamala Limestone: *Dryandra sessilis* var. *cygnorum*, *Hakea trifurcata* and *Calothamnus quadrifidus* Closed Tall Scrub to Open Heath; *Melaleuca acerosa* Closed to Open Heath; *Melaleuca* sp. Yanchep (GJK 11242), *M. huegelii* and *Dodonaea aptera* Closed Tall to Open Heath

Quindalup Dunes

Safety Bay Sands (oldest dunes): Mixed Open Low Heath

Wetlands from Quindalup and Spearwood Dunes: *Eucalyptus rudis* Open Forest to Low Woodland; *Banksia littoralis* Low Open Forest to Low Woodland; *Melaleuca raphiophylla* Closed Forest to Low Woodland; *Typha domingensis/orientalis* Closed Sedgeland; mixed Low Shrubland; Closed to Open Sedgeland which is mixed or is dominated by *Schoenoplectus validus*, *Baumea articulata*, *Lepidosperma drummondii*, *L. gladiatum*, *Baumea laxa* or *B. juncea*; mixed Open Low Heath

Scattered Native Plants: not assessed

Vegetation Condition: >90% Very Good to Excellent, <10% Good to Degraded, with areas of severe localised disturbance

Total Flora: 462 native taxa, 131 weeds (more than Bushplan Site (BS288 and part BS381 after area of CALM 1989) — Keighery, GJ, 1993b plus 22 part Bushplan Site records, including from McComb and McComb 1967; estimated <10% not in Bushplan Site) (estimated >90% expected flora)

Significant Flora: *Stylidium maritimum* (3), *Conostylis pauciflora* subsp. *euryrhipis* (3), *Hibbertia spicata* subsp. *leptothea* (3); *Eucalyptus petrensii*, *Melaleuca cardiophylla*, *Alyogyne huegelii* var. *glabrata*, *Pimelea calcicola*, *Trachymene coerulea*, *Astroloma microcalyx*, *Ricinocarpos glaucus*, *Lechenaultia linarioides*, *Acacia alata* var. *tetrantha*, *Diplopeltis huegelii* subsp. *huegelii*, *Senecio ramosissimus*, *Veronica* aff. *calycina* (BJK and NG 235) rare or uncommon on coastal plain in PMR — *Craspedia variabilis*, *Senecio ramosissimus* (most northern population known), *Actinodium leucocephalus* (particularly rare on western side of Plain), and the ferns *Adiantum aethiopicum*, *Anogramma leptophylla*, *Cheilanthes austrotenuifolia*, *Pteris vittata*; species typical of Tamala Limestone taxa - *Melaleuca* sp. Yanchep (GJK 11242), *Melaleuca huegelii*, *Grevillea preissii*, *Diplopeltis huegelii*, *Eucalyptus foecunda*, *Pimelea calcicola*, *Trymalium ledifolium* subsp. *ledifolium*, *Stylidium junceum* (limestone variant), *Astroloma microcalyx*, *Caladenia longicauda* subsp. *calcigena* ms, *Petrophile serruriae* subsp. nov. (GJK 11421), *Hibbertia spicata* subsp. *leptothea*

Fauna: (area described also includes BS381) surveyed by Western Australian Museum of Natural Science (Storr and Johnstone 1988) and RAOU (1996 D), 8 visits, for birds (134). Structured surveys by Western Australian Museum of Natural Science and CALM for native mammals (15) (Burbidge *et al.* in prep.), reptiles (47) (How and Dell 1994) and fish (2) (Sarti and Allen 1978). Significant populations of Splendid Fairy-wren, Southern Emu-wren, Broad-tailed, Western and Yellow-rumped Thornbills, Weebill, White-browed Scrubwren, Scarlet Robin, Golden Whistler, Grey Shrike-thrush and several honeyeater species. Significant bird species: category 1 (1), category 3 (13) and category 4 (8). Significant mammal species: Quenda (Friend 1996 D), Western Brush Wallaby, Ash Grey Mouse and Echidna



Linkage: adjacent bushland to the north (BS396), south, east (BS381) and west (through bushland to BS289); part of proposed Greenways 37, 2, 38 (Tingay, Alan & Associates 1997a); part of a regionally significant contiguous bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: recommended for protection in the study of City of Wanneroo bushland (Trudgen 1996); contains at least eight regional floristic groups, one group (limestone floristic community type 26a) has been recommended as a 'critically threatened community' (Weston and Gibson 1997); Koala Caves contain an abundance of terrestrial fossils and could provide information for the period between 6,000 and 80,000-1,000,000 years ago from which there are no outcropping marine deposits (Lemmon *et al.* 1979).

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Directory of Important Wetlands in Australia; Listed on the Register of the National Estate

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Diversity, Rarity, Maintaining ecological processes or natural systems, 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

Opportunities and/or Constraints

Opportunities: Bushplan Site/part Bushplan Site subject to Swan Coastal Plain Lakes EPP, Gnangara Mound Crown Land EPP; location of Scheduled Fauna, conservation category wetlands; under MRS Parks and Recreation Reservation and TPS Landscape Zoning, Crown Reserve

Constraints: private land; under MRS Urban Deferred Zoning, MRD regional road requirements, General and Priority Mineral Resource Area (limestone)

Recommendation: The existing purpose, care, control and management of Reserves 9868, 29246 is endorsed. The most appropriate mechanism for the protection of the remainder of this Bushplan Site be considered through the public comment period in consultation with the land owner(s).

RIDGES AND ADJACENT BUSHLAND, YANCHEP/NOWERGUP

Boundary Definition: protected area/bushland (part taken to cadastre) boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 381 **Map no.** 8, 9, 13, 14, 15, 18 **Map sheet series ref. no.** 2034-I NW, 2034-IV NE, 2035-III SE

System 6 (1983): part M3, M4 area of bushland goes beyond System area boundaries, all bushland described

Other Names: not known

Local Authorities (Suburb)

Shire of Wanneroo (Yanchep, Nowergup)

Ownership Categories

State Government

Area (ha): total 3014.1; bushland 3004.9

Zoning

MRS: State Forest, Parks and Recreation

TPS: Landscape

Lot/Location/Reserve numbers (Purpose),

Street name

11544 Old Yanchep Rd; 65, 5608, 5609, 5611 street not identified

Crown Reserve

State Forest 65, Reserve 9868 (National Park)

CALM Managed Land

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Bassendean Dunes

Bassendean Sands (Qpb: S8)

Spearwood Dunes

Sands derived from Tamala Limestone (Qts: S7)

Tamala Limestone (Qtl: LS1)

Wetlands (within the Spearwood/Bassendean Dunes)

Holocene Swamp Deposits (Qhw: Cps)

VEGETATION AND FLORA

Vegetation Complexes

Spearwood Dunes

Karrakatta Complex — North

Cottesloe Complex — North (one of two most northern occurrences)

Cottesloe Complex — Central and South (most northern occurrence)



Floristic Community Types

Supergroup 2: Seasonal Wetlands

14 Deeper wetlands on sandy soils

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau

22 *Banksia ilicifolia* woodlands

23b Northern *Banksia attenuata* — *Banksia menziesii* woodlands

Supergroup 4: Uplands centred on Spearwood and Quindalup Dunes

26a *Melaleuca huegelii* — *M. acerosa* shrublands of limestone ridges

26b Woodlands and mallees on limestone

27 Species poor mallees and shrublands on limestone

28 Spearwood *Banksia attenuata* or *B. attenuata* — *Eucalyptus* woodlands

WETLANDS

Wetland Types: creek; sumpland and dampland (includes wetlands not previously described, CALM 1989, Gibson *et al.* 1994)

Natural Wetland Groups: not defined

Wetland Management Objectives: not defined; Conservation (area not determined, these wetlands not previously described)

Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Not assessed

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: limestone ridge, vegetated wetland, vegetated uplands

Vegetation and Flora: detailed survey (Keighery, GJ, 1993b); limited survey (CALM 1989, Gibson *et al.* 1994 (Yan 4-6, 8-22), Griffin 1994 (Par 01)

Structural Units: mapping (CALM 1989)

Bassendean Dunes

Uplands - *Banksia attenuata* and *Nuytsia floribunda* Low Open Woodland

Spearwood Dunes

Uplands - Sands derived from Tamala Limestone: *Eucalyptus gomphocephala* Woodland; *Eucalyptus marginata* Open Forest to Open Woodland; Low Open Woodlands to Low Woodlands dominated by *Banksia attenuata*, *B. menziesii*, *B. ilicifolia*, *B. grandis*, *Allocasuarina fraseriana* and *Nuytsia floribunda* and combinations of these; *Conospermum stoechadis* Open Heath; mixed Open Heath

Uplands - Tamala Limestone: Closed to Open Heath dominated by *Melaleuca huegelii*, *Melaleuca* sp. Yanchep (GJK 11242), *Thomasia cognata*, *Dryandra sessilis* var. *cygnorum* and *Hakea trifurcata*; *Eucalyptus petrensis* Shrub Mallee; *Eucalyptus foecunda* Shrub Mallee; *Eucalyptus decipiens* Tree Mallee

Wetlands: *Eucalyptus rudis* Woodland; *Melaleuca preissiana* Low Open Forest

Vegetation Condition: >90% Excellent to Pristine, <10% Very Good

Total Flora: 294 native taxa, 32 weeds (plot-generated list only, Gibson *et al.* 1994 and Griffin 1994; see BS288 for total for BS288 and part BS381)

Significant Flora: *Eucalyptus argutifolia* (R), *Sarcozona bicarinata* (3), *Conostylis pauciflora* subsp. *euryrhipis* (3), *Stylidium maritimum* (3), *Melaleuca* sp. Yanchep (GJK 11242) (2), *Conostephium minus* (4), *Diplolaena angustifolia*, *Verticordia nitens*, *Stylidium crossocephalum*, *Eucalyptus foecunda*; species typical of Tamala Limestones — *Grevillea preissii*, *Eucalyptus argutifolia*, *E. petrensis*, *E. foecunda*, *Diplopeltis huegelii*, *Trymalium ledifolium* subsp. *ledifolium*, *Stylidium maritimum*, *S. junceum* (limestone variant), *Astrolooma microcalyx*

Fauna: (area described also includes BS288) surveyed by Western Australian Museum of Natural Science (Storr and Johnstone 1978) and RAOU (1996 D), 8 visits, for birds (134). Structured surveys by Western Australian Museum of Natural Science and CALM recorded native mammals (15) (Burbidge *et al.* in prep.) and reptiles (47) (How and Dell 1994). Significant populations of Splendid Fairy-wren, Southern Emu-wren, Broad-tailed, Western and Yellow-rumped thornbills, Weebill, White-browed Scrubwren, Scarlet Robin, Golden Whistler, Grey Shrike-thrush and several honeyeater species. Significant bird species: category 1 (1), category 3 (13) and category 4 (8). Significant mammal species: Quenda (Friend 1996 D) and Western Brush Wallaby

Linkage: adjacent bushland to the south and west (BS288, BS396); part of proposed Greenway 37 (Tingay, Alan & Associates 1997a); part of a regionally significant contiguous bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: transition area between vegetation of Spearwood and Bassendean Dunes systems; majority of Bushplan Site included in boundaries considered in the Yanchep National Park Management Plan (CALM 1989); proposed to become National Park in Forest Management Plan 1994-2003 (CALM 1994); recommended for protection in the study of City of Wanneroo bushland (Trudgen 1996); part Bushplan Site recommended to be declared as an A-class Nature Reserve for the protection of flora and fauna in Gibson *et al.* 1994; contains seven regional floristic groups, one group (floristic community type 26a) having been recommended as a 'critically threatened community' (Weston and Gibson 1997); included in Gnaragar Park proposal (Bailey 1997)



SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed, Indicative Place of the Register of the National Estate

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Diversity, Rarity, Maintaining ecological processes or natural systems, 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 Gngangara Mound Crown Land EPP; location of Declared Rare Flora, Scheduled Fauna; under MRS Parks and Recreation and TPS Landscape Zoning, Crown Reserve

Constraints: under General and Priority Mineral Resource Area (limestone), mining tenement M70/142 (Swan Portland Cement) for limestone cement and M70/698, M70/699, M70/700, M70/701, M70/702 (WA Limestone) for limestone (subject to reapplication)

Recommendation: The existing care, control and management of this Bushplan Site is endorsed. This site lies within the proposed 'Gngangara Park' (concept announced by Cabinet in 1996) within which areas of remnant native vegetation, such as this Bushplan Site, should be managed in the future to retain and enhance their conservation values.

STATE FOREST 65 — PINJAR PLANTATION CENTRAL BUSHLAND, YANCHEP

Boundary Definition: protected area with bushland boundary (remnants in pine plantation)

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 1, 408-411, 414, 415 **Map no.** 14, 15, 18, 19 **Map sheet series ref. no.** 2034-I NW, 2034-IV NE

Other Names: not known

Area (ha): total 456.4; total bushland 456.3 (7 remnants, from 3.7 to 218.8 ha)

Local Authorities (Suburb)
Shire of Wanneroo (Yanchep)

Zoning
MRS: State Forests
TPS: Landscape

Ownership Categories
State Government

**Lot/Location/Reserve numbers (Purpose),
Street name**
65, 10654 street not identified
State Forest 65, Reserve 39414 (Quarry - limestone)

CALM Managed Land

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Bassendean Dunes

Bassendean Sands (Qpb: S8)

Spearwood Dunes

Sands derived from Tamala Limestone (Qts: S7)

Tamala Limestone (Qtl: LS1, LS2)

VEGETATION AND FLORA

Vegetation Complexes

Spearwood Dunes

Karrakatta Complex — Central and South (most northern occurrence)

Cottesloe Complex — North

Cottesloe Complex — Central and South

Floristic Community Types: not sampled, types not inferred.

Supergroup 4: Uplands centred on Spearwood and Quindalup Dunes

WETLANDS

No wetlands mapped

THREATENED ECOLOGICAL COMMUNITIES

Not determined

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated uplands

Vegetation and Flora: limited survey (McArthur and Mattiske 1985)

Structural Units: mapping (McArthur and Mattiske 1985)

Uplands - Tamala Limestone: Open to Closed Heath dominated by *Dryandra sessilis* var. *cygnorum*, *Melaleuca huegelii* and *Grevillea* species



Uplands - Sands derived from Tamala Limestone: *Banksia* species Woodland with scattered emergent *Eucalyptus gomphocephala* and *E. marginata*; *Banksia* spp. Woodland with scattered *Eucalyptus tottiana* and *E. marginata*
Vegetation Condition: Very Good (Connell 1995)

Total Flora: not known

Significant Flora: none recorded

Fauna: no known information

Linkage: no adjacent bushland

Other Special Attributes: included in Gngangara Park proposal (Bailey 1997); majority recommended for protection in the study of City of Wanneroo bushland (Trudgen 1996)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Criteria not relevant to determination of conservation value, but which may be applied when evaluating areas having similar values

Opportunities and/or Constraints

Opportunities: Bushplan Site/part Bushplan Site subject to Gngangara Mound Crown Land EPP; under TPS Landscape Zoning

Constraints: under General and Priority Mineral Resource Area (limestone)

Recommendation: The existing care, control and management of this Bushplan Site is endorsed. This site lies within the proposed 'Gngangara Park' (concept announced by Cabinet in 1996) within which areas of remnant native vegetation, such as this Bushplan Site, should be managed in the future to retain and enhance their conservation values.

BERNARD ROAD BUSHLAND, CARABOODA

Boundary Definition: bushland taken to cadastre boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 129 **Map no.** 18 **Map sheet series ref. no.** 2034-IV NE

Other Names

Submission Area 290

Local Authorities (Suburb)

Shire of Wanneroo (Carabooda)

Area (ha): total 102.8; bushland 102.3

Zoning

MRS: Rural

TPS: Rural, Landscape, No zone

Lot/Location/Reserve numbers (Purpose),

Street name

50, 6268 Bernard Rd; 6155, 6265, 6266 Wanneroo Rd
 Crown Reserve

Ownership Categories

State Government, Private (including commercial organisation)

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Spearwood Dunes

Sands derived from Tamala Limestone (Qts: S7)

Tamala Limestone (Qtl: LS2)

VEGETATION AND FLORA

Vegetation Complexes

Spearwood Dunes

Cottesloe Complex — Central and South

Floristic Community Types: *not sampled, types inferred

Supergroup 4: Uplands centred on Spearwood and Quindalup Dunes

*24 Northern Spearwood shrublands and woodlands

*26b Woodlands and mallees on limestone

*28 Spearwood *Banksia attenuata* or *B. attenuata* — *Eucalyptus* woodlands

WETLANDS

No wetlands mapped

THREATENED ECOLOGICAL COMMUNITIES

Not assessed

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: limestone ridge, vegetated uplands

Vegetation and Flora: limited survey (DEP 1998, WAWA 1995)

Structural Units

Uplands - Sands derived from Tamala Limestone: *Eucalyptus gomphocephala* Woodland to Forest over *Banksia attenuata*, *B. menziesii* and *Allocasuarina fraseriana* Low Woodland

Uplands- Tamala Limestone: Shrublands to Closed Heaths dominated by one or more combinations of *Melaleuca huegelii*, *M. acerosa* and *Dryandra sessilis* var. *cygnorum*

Vegetation Condition: >70% Very Good to Excellent, <30% Good to Completely Degraded, with areas of severe localised disturbance

Total Flora: not known

Significant Flora: *Sarcozona bicarinata* (3); typical Tamala Limestone taxa - *Melaleuca huegelii*, *Grevillea preissii*, *Trymalium ledifolium* subsp. *ledifolium*, *Petrophile serruriae* subsp. nov. (GJK 11421)

Fauna: no known information

Linkage: adjacent bushland to the north, east and south-west (BS130, across road); part of proposed Greenway 2 (Tingay, Alan & Associates 1997a); part of a regionally significant contiguous bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: adjacent to Coogee Swamp and Springs (*Melaleuca raphiophylla* Low Woodland to Low Open Forest; *Baumea articulata* Sedgeland) which have a significant aquatic invertebrate fauna and are a significant bird breeding area (WAWA 1995); contains historical cave (important fossils) and other karst features (Bastian 1998; Submission no. 176d); recommended for protection in the study of City of Wanneroo bushland (Trudgen 1996); consolidates the linkage between Yanchep and Neerabup National Parks

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Rarity

Opportunities and/or Constraints

Opportunities: Bushplan Site/part Bushplan Site under TPS Landscape Zoning, Crown Reserve

Constraints: private land; under Priority and General Mineral Resource Area (limestone), mining tenement M70/139 (Swan Portland Cement, operator Menchetti) for limestone cement

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s).

LINK BETWEEN YANCHEP AND NEERABUP NATIONAL PARKS

Boundary Definition: protected area/bushland boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 130 **Map no. 18** **Map sheet series ref. no. 1034-IV NE**

Other Names

Part Submission Area 291 reserves between Yanchep and Neerabup National Parks

Area (ha): total 94.5; bushland: 94.3

Local Authorities (Suburb)

Shire of Wanneroo (Carabooda, Alkimos)

Zoning

MRS: Parks and Recreation, Controlled Access Highways, Important Regional Roads, Other Major Highways

TPS: Landscape

Ownership Categories

State Government, Commonwealth Government, Private (commercial organisation)

Lot/Location/Reserve numbers (Purpose), Street name

102 Romeo Rd; M1482, 4144, 6282, 6283, 6284, 6285, 6286, 11989 Wanneroo Rd
Crown Reserve

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Spearwood Dunes

Sands derived from Tamala Limestone (Qts: S7)

Tamala Limestone (Qtl: LS1, LS2)

VEGETATION AND FLORA

Vegetation Complexes

Spearwood Dunes

Cottesloe Complex — Central and South



Floristic Community Types: *not sampled, type inferred

Supergroup 4: Uplands centred on Spearwood and Quindalup Dunes

*24 Northern Spearwood shrublands and woodlands

*28 Spearwood *Banksia attenuata* or *B. attenuata* — *Eucalyptus* woodlands

WETLANDS

No wetlands mapped

THREATENED ECOLOGICAL COMMUNITIES

Not assessed

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: limestone ridge, vegetated uplands

Vegetation and Flora: detailed survey (part Bushplan Site — Ecologia 1997); limited survey (Submission No. 176e)

Structural Units: mapping (part Bushplan Site — Ecologia 1997)

Uplands - Sands derived from Tamala Limestone: Woodlands dominated by *Eucalyptus gomphocephala*, *E. marginata*, *Banksia attenuata* Low Woodlands

Uplands - Tamala Limestone: Heaths to Low Shrublands dominated by *Dryandra sessilis* var. *cygnorum*, *Xanthorrhoea preissii*, *Scaevola thesioides* and *Trymalium ledifolium* subsp. *ledifolium*

Vegetation Condition: >75% Very Good to Excellent, <25% Good, with areas of severe localised disturbance associated with track development

Total Flora: not known

Significant Flora: typical Tamala Limestone taxa - *Trymalium ledifolium* subsp. *ledifolium*

Fauna: limited survey by Ecologia (1997) recorded birds (41), native mammals (4), reptiles (17) and amphibians (3). Significant bird species: category 1 (2), category 3 (16) and category 4 (13). Significant mammal species: Quenda (Friend 1996 D). Significant reptile species: dragon (*Tympanocryptis adelaidensis*), Clawless Gecko (*Crenadactylus ocellatus*) and Black Monitor (*Varanus tristis*)

Linkage: adjacent bushland to the north-east (BS129, across road) and west; part of proposed Greenway 2 (Tingay, Alan & Associates 1997a); part of a regionally significant contiguous bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: recommended for protection in the study of City of Wanneroo bushland (Trudgen 1996)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: REPRESENTATION of ecological communities, Rarity, Maintaining ecological processes or natural systems

Opportunities and/or Constraints

Opportunities: Bushplan Site/part Bushplan Site location of Scheduled Fauna; under MRS Parks and Recreation Reservation and TPS Landscape Zoning, Crown Reserve

Constraints: private land; under MRD regional road requirements, General and Priority Mineral Resource Area (limestone)

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s). This Bushplan Site is already reserved for Parks and Recreation in the Metropolitan Region Scheme — it should be made a reserve with a conservation purpose.

HOPKINS ROAD BUSHLAND, NOWERGUP

Boundary Definition: protected area/bushland (part taken to cadastre) boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 290

Map no. 19, 26

Map sheet series ref. no. 2034-I NW, 2034-I SW

Other Names: not known

Area (ha): total 437.6; bushland 406.9

Local Authorities (Suburb)

Zoning

Shire of Wanneroo (Yanchep)

MRS: State Forests

TPS: Landscape

PERTH DESCRIPTIONS

Ownership Categories
State Government

**Lot/Location/Reserve numbers (Purpose),
Street name**
65, 3050 Wesco Rd
Crown Reserve
State Forest 65

CALM Managed Land

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Spearwood Dunes

Sands derived from Tamala Limestone (Qts: S7)
Tamala Limestone (Qtl: LS1)

VEGETATION AND FLORA

Vegetation Complexes

Spearwood Dunes

Karrakatta Complex — Central and South
Cottesloe Complex — Central and South

Floristic Community Types: *not sampled, type inferred

Supergroup 4: Uplands centred on Spearwood and Quindalup Dunes

*26b Woodlands and mallees on limestone

*28 Spearwood *Banksia attenuata* or *B. attenuata* — *Eucalyptus* woodlands

WETLANDS

No wetlands mapped

THREATENED ECOLOGICAL COMMUNITIES

Not assessed

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: limestone ridge, vegetated uplands

Vegetation and Flora: limited survey (Mattiske Consulting Pty. Ltd. 1997, WAWA 1995)

Structural Units: limited mapping (WAWA 1995)

Uplands - Sands derived from Tamala Limestone: Woodlands dominated by *Eucalyptus marginata*, *Banksia attenuata* and *B. grandis*; *Banksia* species Woodland with emergent *Eucalyptus gomphocephala*; *Banksia* spp. Woodland with scattered *Eucalyptus tottiana* and *E. marginata*

Uplands - Tamala Limestone: Closed Heath dominated by *Xanthorrhoea preissii*, *Dryandra sessilis* var. *cygnorum*, *Melaleuca huegelii* and *M. acerosa*

Scattered Native Plants: not assessed

Vegetation Condition: Excellent (Mattiske Consulting Pty. Ltd. 1997)

Total Flora: not known

Significant Flora: *Eucalyptus argutifolia* (R); typical Tamala Limestone taxa - *Melaleuca huegelii*

Fauna: no systematic survey. Significant mammal species: Quenda (Friend 1996 D)

Linkage: adjacent bushland to the south (to BS293) and west; part of proposed Greenways 32, 17 (Tingay, Alan & Associates 1997a)

Other Special Attributes: included in Gngangara Park proposal (Bailey 1997); recommended for protection in the study of City of Wanneroo bushland (Trudgen 1996)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Rarity

Opportunities and/or Constraints

Opportunities: Bushplan Site/part Bushplan Site subject to Gngangara Mound Crown Land EPP; location of Declared Rare Flora; under TPS Landscape Zoning, Crown Reserve

Constraints: under Priority and General Mineral Resource Area (limestone), mining tenements M70/126, M70/266 (Vigeo Pty Ltd) for limestone road base for building stone, M70/341 (Limestone Resources Aust Pty Ltd Carabooda Limestone) for limestone dimension stone, M70/339 (Limestone Building Block) for Limestone, M70/13 (Limestone Building Block Co. Pty Ltd) for limestone, M70/138 (Swan Portland Cement and Perth Limestone Resources) for limestone dimension stone

Recommendation: The existing care, control and management of this Bushplan Site is endorsed. This site lies within the proposed 'Gngangara Park' (concept announced by Cabinet in 1996) within which areas of remnant native vegetation, such as this Bushplan Site, should be managed in the future to retain and enhance their conservation values.



**STATE FOREST 65 — PINJAR PLANTATION SOUTH BUSHLAND,
NOWERGUP/YANCHEP/NEERABUP**

Boundary Definition: protected area with bushland (95, 134-137, 139, 140, 417, 444, 446, 451, 455); protected area with bushland group (425, 428), protected area with bushland (part taken to cadastre)/bushland group (444); protected area with bushland (part taken to cadastre)/bushland (457) boundaries (134 - Areas of bushland within the boundaries of the Bushplan Site are not accurately mapped. The boundary has been drawn to include the unmapped bushland; remnants in pine plantation)

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 95, 134-137, 139, 140, 417, 425, 428, 444, 446, 451, 455, 457 **Map no.** 19, 26 **Map sheet series ref. no.** 2034-I NW, 2034-I SW

Other Names: not known

Area (ha): total 94.4; bushland total 61.5 (15 remnants, from 1.3 to 7.5 ha)

Local Authorities (Suburb)
Shire of Wanneroo (Nowergup, Yanchep, Neerabup)

Zoning
MRS: State Forests, Parks and Recreation
TPS: Landscape

Ownership Categories
State Government, Local Government

**Lot/Location/Reserve numbers (Purpose),
Street name**
65, 5665 street not identified; 3050 Wesco Rd; 2514, 12748 Wattle Ave; 4 Mather Dr
Crown Reserve
State Forest 65

CALM Managed Lands

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Spearwood Dunes
Sands derived from Tamala Limestone (Qts: S7)
Tamala Limestone (Qtl: LS1)
Wetlands (within the Spearwood Dunes)
Holocene Swamp Deposits (Qhw: S4)

VEGETATION AND FLORA

Vegetation Complexes
Spearwood Dunes
Karrakatta Complex — Central and South
Cottesloe Complex — Central and South
Wetlands
Pinjar Complex

Floristic Community Types: not sampled, types not inferred.

Supergroup 2: Seasonal Wetlands
Supergroup 4: Uplands centred on Spearwood and Quindalup Dunes

WETLANDS

Wetland Types: dampland, sumpland
Natural Wetland Groups

Bassendean Dunes
Pinjar (B.1)
Gnangara (B.2)

Wetland Management Objectives: Conservation (BS425 2.7ha, BS451 1.5ha), Resource Enhancement (BS136)

Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Not determined

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated wetland, vegetated uplands

Vegetation and Flora: only broad regional information is generally given for Bushplan Site descriptions for combined remnants in pine plantation

Vegetation Condition: Very Good (Connell 1995)
Total Flora: not known
Significant Flora: none recorded

Fauna: no known information



Linkage: generally no adjacent bushland except for - south of BS135 (BS293), north and south of BS428 (BS444, area outside Bushplan Site), north and south of BS444 (BS457, BS428), south of BS455 (BS457), north and south of BS457 (BS455, BS444)

Other Special Attributes: part Bushplan Site subject to Gngangara Mound Crown Land EPP; included in Gngangara Park proposal (Bailey 1997)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, 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

Opportunities and/or Constraints

Opportunities: Bushplan Site/part Bushplan Site location of conservation category wetlands; under MRS Parks and Recreation Reservation and TPS Landscape Zoning, Crown Reserve

Constraints: under General Mineral Resource Area (limestone)

Recommendation: The existing care, control and management of this Bushplan Site is endorsed. This site lies within the proposed 'Gngangara Park' (concept announced by Cabinet in 1996) within which areas of remnant native vegetation, such as this Bushplan Site, should be managed in the future to retain and enhance their conservation values.

NEERABUP NATIONAL PARK, LAKE NOWERGUP NATURE RESERVE AND ADJACENT BUSHLAND, NEERABUP

Boundary Definition: protected area/bushland (part taken to cadastre) boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 383 **Map no.** 18, 25, 26, 31, 32 **Map sheet series ref. no.** 2034-I SW, 2034-IV NE, 2034-IV SE, 2034-V SE

System 6 (1983): M6 area of bushland goes beyond System area boundaries, all bushland described

Other Names: not known

Area (ha): total 1858.3 (includes open water); bushland 1717.2

Local Authorities (Suburb)

Shire of Wanneroo (Neerabup, Carabooda, Nowergup, Clarkson, Tamala Park), City of Joondalup (Kinross, Neerabup)

Zoning

MRS: Parks and Recreation, Rural, Urban, Other Major Highways, Important Regional Road, Public Purposes-Water Authority of WA

TPS: Rural, Landscape, Parks and Recreation.

Ownership Categories

State Government, Private (including commercial organisation), Local Government

Lot/Location/Reserve numbers (Purpose),

Street name

1, 2, 3, 12, 14, 3323, 6270, 6764, 6765, 9245, 10313, 11533, 11607 Wanneroo Rd; 10313 Lukin Dr; 52, 3323, 9538, 9630 Burns Beach Rd; 19, 3323 Connolly Dr; 3, 4 Gibbs Rd; 11 Joondalup Dr; Crown; 12, 52, 70, 13712, 12520 street not identified

Crown Reserve

Reserve 27575 (National Park), Reserve 24581 (Conservation of Flora and Fauna)

CALM Managed Land

SECTION 2: REGIONAL INFORMATION

LANDFORM AND SOIL

Spearwood Dunes

Sands derived from Tamala Limestone (Qts: S7)

Tamala Limestone (Qt: LS1, LS2)

Wetlands (within the Spearwood Dunes)

Holocene Swamp Deposits (Qhw: Cps)

VEGETATION AND FLORA

Vegetation Complexes

Spearwood Dunes

Karrakatta Complex — Central and South

Cottesloe Complex — Central and South



Wetlands

Herdsmen Complex

Floristic Community Types: *not sampled, types inferred

Supergroup 2: Seasonal Wetlands

*S7 Northern woodlands to forests over tall sedgeland alongside permanent wetlands

Supergroup 4: Uplands centred on Spearwood and Quindalup Dunes

24 Northern Spearwood shrublands and woodlands

28 Spearwood *Banksia attenuata* or *B. attenuata* — *Eucalyptus* woodlands

*26a *Melaleuca huegelii* — *M. acerosa* shrublands of limestone ridges

*27 Species poor mallees and shrublands on limestone

WETLANDS

Wetland Types: lake, sumpland

Natural Wetland Groups

Spearwood Dunes

Yancheep (S.1)

Wetland Management Objectives: Conservation (66.7ha)

Swan Coastal Plain Lakes EPP: <53.1ha + 1.8ha + 0.8ha + <10.9ha = 57.5ha (total)

THREATENED ECOLOGICAL COMMUNITIES

Not assessed, Not determined

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: limestone ridge, open water, vegetated wetland, vegetated uplands

Vegetation and Flora: detailed survey (part Bushplan Site, Neerabup NP — Keighery, BJ, *et al.* 1997b); limited survey (part Bushplan Site, Lake Nowergup NR — EPA and WAWA 1990, Gibson *et al.* 1994 (Neer 1-11, 20-23); part Bushplan Site, Neerabup NP — Semeniuk, V&C Research Group 1991a)

Structural Units: mapping (EPA and WAWA 1990, Keighery, BJ, *et al.* 1997b, Semeniuk, V&C Research Group 1991a)

Uplands - Sands derived from Tamala Limestone: *Eucalyptus gomphocephala* Woodland to Open Forest; *Eucalyptus marginata* Woodland to Forest generally over *Banksia* woodland; Woodlands dominated by *Banksia attenuata*, *B. menziesii*, *Allocasuarina fraseriana* and *Nuytsia floribunda* and combinations of these; *Jacksonia sternbergiana* Low Forest

Uplands - Tamala Limestones: Shrublands to Open Low Heath dominated by *Xanthorrhoea preissii*, *Hakea trifurcata*, *Calothamnus quadrifidus*, *Melaleuca acerosa*, *Dryandra sessilis* var. *cygnorum*, *Melaleuca huegelii* and *Acacia lasiocarpa* and combinations of these

Wetlands: *Eucalyptus rudis* Open Forest; *Eucalyptus rudis* and *Banksia littoralis* Forest; *Melaleuca raphiophylla* Low Closed Forest to Low Woodland; *Acacia saligna* Low Open Forest; *Typha* Closed Sedgeland; *Baumea articulata* Closed Sedgeland; mixed Closed Sedgeland to Sedgeland

Scattered Native Plants: not assessed

Vegetation Condition: >85% Very Good to Excellent, <15% Good to Degraded, with areas of severe localised disturbance

Total Flora: 315 native taxa, 66 weeds (estimated >85% expected flora) (Keighery, BJ, *et al.* 1997b plus four records from EPA and WAWA 1990)

Significant Flora: *Lepidium pseudohyssopifolium* (1), *Jacksonia sericea* (3), *Stylidium maritimum* (3), *Hibbertia spicata* subsp. *leptotheca* (3, endemic to Tamala Limestone); *Conostylis candicans* subsp. *calcicola*, *Ricinocarpus glaucus*, *Hemiandra pungens* (dune form), *Alyogyne huegelii* var. *glabrata*, *Baeckea robusta* subsp. nov. (perhaps a local variant of a widespread species), *Nemcia reticulatum* (coastal form), *Grevillea crithmifolia*, *Hakea lissocarpa*, *Persoonia comata* (at southern end of range), *Petrophile serruriae* subsp. nov., *Leptomeria empetrififormis*, *Glischrocaryon aureum*, *Lechenaultia linarioides*; typical Tamala Limestone Taxa: (Keighery, BJ, *et al.* 1997b) — *Grevillea preissii*, *Diplopeltis huegelii*, *Eucalyptus foecunda*, *Pimelea calcicola*, *Trymalium ledifolium* subsp. *ledifolium*, *Stylidium junceum* (limestone variant), *Astroloma microcalyx*, *Caladenia longicauda* subsp. *calcigena* ms, *Schoenus lanatus*, *Petrophile serruriae* subsp. nov (GJK 11421), *Leptomeria empetrififormis*

Fauna: surveyed by RAOU (1996 D), 9 visits, and Dell *et al.* (1998) for birds (56), CALM (1993) for native mammals (4) and by B. Maryan and D. Robinson (pers. comm.) for reptiles (19) and amphibians (2). Significant populations of insectivorous passerine birds including Splendid Fairy-wren, Broad-tailed, Western and Yellow-rumped thornbills, Weebill, White-browed Scrubwren, Scarlet Robin, Golden Whistler and Grey Shrike-thrush. Lake Nowergup has large numbers of waterfowl (D. Lamont pers. com. IN: EPA 1990). Significant bird species: category 1 (1), category 3 (12) and category 4 (7). Significant mammal species: Honey Possum and Western Brush Wallaby. Significant reptile species: Carpet Python (*Morelia spilota*)

Linkage: adjacent bushland to the north, south (BS299, across road), east and west (BS323, through bushland to BS397); part of proposed Greenways 36, 2, 5, 42 (Tingay, Alan & Associates 1997a); part of a regionally significant contiguous bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: contains six regional floristic groups; recommended for protection in the study of City of Wanneroo bushland (Trudgen 1996); includes core of areas recommended for conservation by Semeniuk, V&C Research Group (1991a); part of a regionally significant contiguous bushland/wetland linkage (Volume 2A, Map 8)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Listed on the Register of the National Estate

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Rarity, Maintaining ecological processes or natural systems, 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 Coastal Plain Lakes EPP; location of Scheduled Fauna, conservation category wetlands; under MRS Parks and Recreation Reservation and TPS Landscape Zoning and Parks and Recreation Zoning, Crown Reserve

Constraints: private land; under MRS Urban Zoning, MRD regional road requirements, Priority and General Mineral Resource Area (limestone), mining tenement M70/717 (General Building Co. Pty Ltd) for limestone roadbase

Recommendation: The existing purpose, care, control and management of Reserves 27575, 24581 is endorsed. The most appropriate mechanism for the protection of the remainder of this Bushplan Site be considered through the public comment period in consultation with the land owner(s). This may include parts for which: The Bushplan Site be reserved for Parks and Recreation in the Metropolitan Region Scheme, purchased and added to Neerabup National Park.

NEERABUP LAKE AND ADJACENT BUSHLAND, NEERABUP

Boundary Definition: protected area boundary (Areas of bushland within the boundaries of the Bushplan Site are not accurately mapped.)

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 384 **Map no.** 25, 26, 32 **Map sheet series ref. no.** 2034-I SW, 2034-IV SE

Other Names

Submission Area 293

Local Authorities (Suburb)

Shire of Wanneroo (Neerabup)

Ownership Categories

Private (including commercial organisation), State Government

Area (ha): total 400.3 (includes open water); bushland 242.4

Zoning

MRS: Parks and Recreation

TPS: Rural

Lot/Location/Reserve numbers (Purpose), Street name

1, 10, 16, 17, 18, 19, 20, 21, 22, 23, 27, 36, 37, 38, 40, 41, 43, 44, 46, 47, 1221, 9804, 12227 Wanneroo Rd; 105 Flynn Dr; 6, 10824 Lake Rd; 1, 12, 43, 10214, 10601 Wattle Ave
Crown Reserve

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Spearwood Dunes

Sands derived from Tamala Limestone (Qts: S7)

Tamala Limestone (Qtl: LS1, LS2)

Wetlands (within the Spearwood Dunes)

Holocene Swamp Deposits (Qhw: Cps)

VEGETATION AND FLORA

Vegetation Complexes

Spearwood Dunes

Cottesloe Complex — Central and South

Wetlands

Herdsmen Complex

Floristic Community Types: *not sampled, type inferred

Supergroup 2: Seasonal Wetlands

*S7 Northern woodlands to forests over tall sedgeland alongside permanent wetlands

Supergroup 4: Uplands centred on Spearwood and Quindalup Dunes

*24 Northern Spearwood shrublands and woodlands



*28 Spearwood *Banksia attenuata* or *B. attenuata* — *Eucalyptus* woodlands

WETLANDS

Wetland Types: sumpland, creek

Natural Wetland Groups

Spearwood Dunes

Yanchep (S.1)

Wetland Management Objectives: Conservation (1153.8m), Resource Enhancement

Swan Coastal Plain Lakes EPP: 91.2ha

THREATENED ECOLOGICAL COMMUNITIES

Not assessed, Not determined

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: limestone ridge, open water, vegetated wetland, creek, vegetated uplands

Vegetation and Flora: limited survey (DEP 1998, EPA and WAWA 1990, McArthur and Mattiske 1985, WAWA 1995)

Structural Units: mapping (EPA and WAWA 1990, McArthur and Mattiske 1985)

Uplands - Sands derived from Tamala Limestone: *Eucalyptus gomphocephala* Open Forest to Open Woodland

Uplands - Tamala Limestone: mixed Closed Heath to Closed Low Heath; *Dryandra sessilis* var. *cygnorum* Heath

Wetlands: *Eucalyptus rudis* Closed Forest to Open Woodland; *Melaleuca raphiophylla* Low Closed Forest to

Low Open Forest; *Acacia saligna* Low Open Forest to Woodland, *Typha* species Open to Closed Sedgeland;

Baumea articulata Closed Sedgeland to Sedgeland

Scattered Native Plants: *Eucalyptus gomphocephala* and *E. marginata*

Vegetation Condition: <50% Very Good, >% Good to Degraded, with areas of severe localised disturbance

Total Flora: not known

Significant Flora: none recorded

Fauna: no known information

Linkage: adjacent bushland to the north, south, east (BS293) and west; part of proposed Greenway 2 (Tingay, Alan & Associates 1997a); part of a regionally significant contiguous bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: part Bushplan Site recommended for protection in the study of City of Wanneroo bushland (Trudgen 1996); contains karst features including Orchestra Shell Cave (Submission No. 176g; Bastian 1998); aboriginal heritage place (Submission No. 176g)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Maintaining ecological processes or natural systems, 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

Opportunities and/or Constraints

Opportunities: Bushplan Site/part Bushplan Site subject to Swan Coastal Plain Lakes EPP; location of conservation category wetland; under MRS Parks and Recreation Reservation, Crown Reserve

Constraints: private land; Priority and General Mineral Resource Area (limestone)

Recommendation: The most appropriate mechanism for the protection of the remainder of this Bushplan Site be considered through the public comment period in consultation with the land owner(s). This Bushplan Site is already reserved for Parks and Recreation in the Metropolitan Region Scheme — it should be made a reserve with a conservation purpose.

SHIRE VIEW HILL AND ADJACENT BUSHLAND, NOWERGUP/NEERABUP

Boundary Definition: protected area/management/bushland boundary (Areas of bushland within the boundaries of the Bushplan Site are not accurately mapped.)

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 293

Map no. 26

Map sheet series ref. no. 2034-I SW

Other Names

Area (ha): total 269.8; bushland 268.1

Submission Area 292

Local Authorities (Suburb)

Zoning

Shire of Wanneroo (Nowergup, Neerabup)

MRS: Industrial, Rural, State Forest

TPS: Rural, Landscape



Ownership Categories

Private (commercial organisation), State Government,
Local Government, Not identified

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

8, 2514, 2522, 5204, 8505 Wattle Ave; 2522 Wesco Rd;
21 Flynn Dr; 2695, 6217 street not identified
Crown Reserve
State Forest 65

CALM Managed Land

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Spearwood Dunes

Sands derived from Tamala Limestone (Qts: S7)

Tamala Limestone (Qtl: LS1)

VEGETATION AND FLORA

Vegetation Complexes

Spearwood Dunes

Karrakatta Complex — Central and South

Cottesloe Complex — Central and South

Floristic Community Types: *not sampled, type inferred

Supergroup 2: Seasonal Wetlands

*5 Mixed shrub damplands

Supergroup 4: Uplands centred on Spearwood and Quindalup Dunes

*24 Northern Spearwood shrublands and woodlands

*28 Spearwood *Banksia attenuata* or *B. attenuata* — *Eucalyptus* woodlands

26a *Melaleuca huegelii* — *M. acerosa* shrublands of limestone ridges

27 Species poor mallees and shrublands on limestone

WETLANDS

Wetland Types: dampland (includes wetlands not previously described, DEP 1996)

Natural Wetland Groups:

Bassendean Dunes (includes wetlands not previously described, DEP 1996)

Pinjar (B.1)

Wetland Management Objectives: Conservation (includes wetlands not previously described, DEP 1996)

Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Not assessed

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: limestone ridge, vegetated uplands, vegetated wetland

Vegetation and Flora: limited survey (Gibson *et al.* 1994 (SVH 01-02), DEP 1996)

Structural Units

Uplands - Sands derived from Tamala Limestone: *Banksia attenuata* and *B. menziesii* Low Woodland with scattered emergent *Eucalyptus marginata*, *E. gomphocephala* and *E. todtiana*; mixed Open Heath

Uplands - Tamala Limestone: *Melaleuca acerosa* and *M. huegelii* Closed Heath; *Eucalyptus petrensis* Shrub Mallee; *Dryandra sessilis* var. *cygnorum* Closed Heath

Wetland: *Melaleuca preissiana* Low Open Woodland

Scattered Native Plants: not applicable

Vegetation Condition: >75% Excellent, <25% Very Good to Good, with areas of severe localised disturbance associated with tracks, pine plots and quarries

Total Flora: 73 native taxa, 18 weeds (part Bushplan Site, plot-generated list only plus several dominants)

Significant Flora: possibly *Eucalyptus argutifolia* (R) (recorded from north of Shire View Hill); *Stylidium maritimum* (3); *Podolepis canescens* (unusual form with white flowers, only record on the Swan Coastal Plain in the PMR), *Acacia alata* var. *tetrantha*; Typical Tamala Limestone Taxa - *Melaleuca huegelii*, *Eucalyptus petrensis*, *Grevillea preissii*, *Stylidium maritimum*, *Acacia alata* var. *tetrantha*

Fauna: no systematic survey. Significant reptile species: Carpet python (*Morelia spilota*) (Submission no. 176f)

Linkage: adjacent bushland to the north (BS135); south and west (BS384); part of proposed Greenway 32 (Tingay, Alan & Associates 1997a); part of a regionally significant contiguous bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: recommended for protection in the study of City of Wanneroo bushland (Trudgen 1996); Threatened or Poorly Reserved Plant Community (EPA 1994 GIS); contains five regional floristic groups, one group (floristic community type 26a) having been recommended as a 'critically threatened community' (Weston and Gibson 1997); Shire View Hill is one of the tallest limestone peaks on the Plain; part Bushplan Site included in Gnangara Park proposal (Bailey 1997)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Diversity, Rarity, Maintaining ecological processes or natural systems, 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 Gnangara Mound Crown Land EPP; location of Declared Rare Flora and Scheduled Fauna, conservation category wetlands; under TPS Landscape Zoning, Crown Reserve

Constraints: private land; under MRS Industrial Zoning, Priority and General Mineral Resource Area (limestone), mining tenement M70/138 (Swan Portland Cement and Perth Limestone Resources) for limestone dimension stone

Recommendation: The existing care, control and management of the CALM managed area of this Bushplan Site is endorsed. This part of the site lies within the proposed 'Gnangara Park' (concept announced by Cabinet in 1996) within which areas of remnant native vegetation, such as this Bushplan Site, should be managed in the future to retain and enhance their conservation values. The most appropriate mechanism for the protection of the remainder of this Bushplan Site to be considered through the public comment period in consultation with the land owner(s).

FLYNN DRIVE BUSHLAND, NEERABUP

Boundary Definition: bushland (part taken to zoning)/management boundary (Part Bushplan Site, part Lots 1, 2001 Flynn Dr, subject to Ministerial Condition No. 280, 21 August 1992.)

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 295 **Map no. 26, 27, 32 Map sheet series ref. no. 2034-I SW**

Other Names: not known

Local Authorities (Suburb)

Shire of Wanneroo (Neerabup, Carramar, Cockman)

Area (ha): total 118.1; bushland 112.6

Zoning

MRS: Urban, Rural, Industrial, Parks and Recreation, Important Regional Roads

TPS: Landscape, Residential Development, Rural

Lot/Location/Reserve numbers (Purpose),

Street name

1, 2001, 2477 Flynn Dr; 4, 40, 41 Mather Dr; 505 Pederick Rd; 11598 Pinjar Rd

Crown Reserve

Ownership Categories

State Government, Local Government, Private

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Bassendean Dunes

Bassendean Sands (Qpb: S8)

Bassendean Dunes/Pinjarra Plain

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

Spearwood Dunes

Sands derived from Tamala Limestone (Qts: S7)

Lagoonal and Estuarine Deposits (within the Spearwood Dunes)

Lagoonal and Estuarine Deposits (Vasse) (Qhg: S4)

VEGETATION AND FLORA

Vegetation Complexes

Spearwood Dunes

Karrakatta Complex — Central and South

Cottesloe Complex — Central and South

Wetlands

Pinjar Complex

Floristic Community Types: *not sampled, types inferred

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau

*22 *Banksia ilicifolia* woodlands

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

Supergroup 4: Uplands centred on Spearwood and Quindalup Dunes

*28 Spearwood *Banksia attenuata* or *B. attenuata* — *Eucalyptus* woodlands

WETLANDS

Wetland Types: sumpland
Natural Wetland Groups

- Bassendean Dunes**
- Pinjar (B.1)
- Gnangara (B.2)

Wetland Management Objectives: Conservation (2ha)
Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Not assessed

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated uplands, vegetated wetlands

Vegetation and Flora: limited survey (DEP 1996 (Pinj 0), 1998, part Bushplan Site — Bowman Bishaw Gorham 1992b, WAWA 1995)

Structural Units: mapping (part Bushplan Site — Bowman Bishaw Gorham 1992b, WAWA 1995)

Uplands - Sands derived from Tamala Limestone: Low Woodland to Low Open Forest dominated by *Banksia attenuata* and *B. menziesii* with scattered to co-dominant *Eucalyptus todtiana*, *E. marginata*, *Nuytsia floribunda* and *Allocasuarina fraseriana*; *Adenanthos cygnorum* Tall Closed Scrub to Tall Shrubland; *Hibbertia hypericoides*, *Daviesia triflora* and *Leucopogon conostephioides* Open to Closed Low Heath

Wetlands: no known information

Scattered Native Plants: not assessed

Vegetation Condition: >75% Excellent to Very Good, <25% Good to Degraded, with areas of severe localised disturbance

Total Flora: not known

Significant Flora: *Conostephium minus* (4); *Boronia purdieana*

Fauna: no systematic survey. Location for rare native bee (*Hylaeus globuliferus*) (Pawluck, Richard and Associates 1995)

Linkage: adjacent bushland to the north (BS382, across road), south and west; part of proposed Greenway 17 (Tingay, Alan & Associates 1997a); part of a regionally significant fragmented bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: recommended for protection in the study of City of Wanneroo bushland (Trudgen 1996).

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Rarity, General criteria for the protection of wetland, streamline and estuarine fringing and coastal vegetation

Opportunities and/or Constraints

Opportunities: Bushplan Site/part Bushplan Site location of conservation category wetlands; under MRS Parks and Recreation Reservation and TPS Landscape Zoning, Planning Control Area No. 29, Crown Reserve

Constraints: private land; under MRS Urban Zoning, MRS Industrial Zoning, MRD regional road requirements

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s). (Note: Part Bushplan Site, part Lots 1, 2001 Flynn Dr subject to Ministerial Condition No. 280, 21 August 1992.)

LITTLE COOGEE FLAT, PINJAR

Boundary Definition: bushland boundary (remnant in pine plantation)

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 443 **Map no.** 33 **Map sheet series ref. no.** 2034 I SW

System 6 (1983): Part M8 part System area bushland, only bushland described

Other Names: not known **Area (ha):** total 5.6; bushland 5.6

Local Authorities (Suburb)

Shire of Wanneroo (Pinjar)

Zoning

MRS: Rural, State Forests

TPS: Landscape, Rural

Lot/Location/Reserve numbers (Purpose),

Street name

1706 Ziatas Rd

Crown Reserve

Ownership Categories

State Government



SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Bassendean Dunes/Pinjarra Plain

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

Wetlands (within the Spearwood Dunes)

Holocene Swamp Deposits (Qhw: Cps)

VEGETATION AND FLORA

Vegetation Complexes

Wetlands

Pinjar Complex

Floristic Community Types: not sampled, types not inferred

Supergroup 2: Seasonal Wetlands

Supergroup 4: Uplands centred on Spearwood and Quindalup Dunes

WETLANDS

Wetland Types: dampland

Natural Wetland Groups

Bassendean Dunes

Gnangara (B.2)

Wetland Management Objectives: Conservation (3.9ha)

Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Not determined

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated wetland, vegetated uplands

Vegetation and Flora: not field-surveyed (aerial photography interpretation only)

Structural Units: only broad regional information is generally given for Bushplan Site descriptions for remnants in pine plantation

Vegetation Condition: Very Good

Total Flora: not known

Significant Flora: none recorded

Fauna: no known information Significant mammal species: Quenda (Friend 1996 D)

Linkage: no adjacent bushland; part of contiguous fragmented potential bushland/wetland linkage (Volume 2A, Map 8)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed, Indicative Place of the Register of the National Estate

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, 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

Opportunities and/or Constraints

Opportunities: Bushplan Site/part Bushplan Site location of conservation category wetlands; under TPS Landscape Zoning, Crown Reserve

Constraints: under General Mineral Resource Area (sand)

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s).

YELLAGONGA REGIONAL PARK, WANNEROO/WOODVALE/KINGSLEY

Boundary Definition: protected area/bushland/conservation wetland boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 299

Map no. 32, 38, 39, 44, 45

Map sheet series ref. no. 2034-I SW,
2034-II NW

System 6 (1983): M7 area of bushland goes beyond System area boundaries, all bushland described

Other Names

Contains Lake Joondalup and Lake Goollelal

Area (ha): total 1252.4 (includes open water); bushland 380.9



Local Authorities (Suburb)

City of Joondalup (Woodvale, Edgewater, Joondalup, Wanneroo, Kingsley)

Ownership Categories

Private (including commercial organisation), State Government, Local Government, Not identified

Zoning

MRS: Urban, Important Regional Roads, Parks and Recreation, Central City Area

TPS: Landscape, Residential Development

Lot/Location/Reserve numbers (Purpose), Street name

9695, 9697, 10743 Edgewater Dr; 6, 23, 25, 26, 33, 34, 35, 37, 137, 138, 139, 141, 322, 505 Scenic Dr; 3, 28, 36, 73 Ariti Ave; 0, 1, 3, 7, 8, 16, 92, 100, 303, 2701, 31048 Ocean Reef Rd; 7, 8 Church St; 4, 9, 51, 12050 Joondalup Dr; 24 Pinelli Rd; 2, 21708 Crowther Rd; 143, 591 Banyandah Blvd; 1, 2, 3, 6, 7, 15, 21, 22, 24, 25, 26, 27, 30, 31, 40, 50, 51, 58, 59, 60, 64, 65, 66, 73, 75, 76, 79, 82, 80, 81, 83, 84, 91, 100, 101, 120, 121, 122, 132, 304, 709, 3709, 9471, 10146 Wanneroo Rd; 2, 3, 6, 455, 8202, 11264 Lakeside Dr; 4, 5, 6, 7, 8, 9, 20, 21, 22, 28, 29 Drovers Pl; 1, 2, 12, 13, 14, 15, 16, 17, 18, 19, 52, 100 Goollelal Dr; 20, 43, 50, 709 Bindaree Tce; 0 Plover Way; 41, 42, 43, 44, 45, 82 Lakeway Dr; 0, 38, 39, 40, 42, 44, 45, 46 Della Rd; 23, 26, 29, 30, 35, 37, 43, 53, 54, 55, 56, 69, 75 Duffy Tce; 1, 48, 49, 50, 51, 61, 62, 74 Hocking Rd; 49 Mooro St; 0, 2, 36, 72, 78, 80, 101 Woodvale Dr; 10872 Castlegate Wy; 26, 27, 34, 36 Poinciana Pl; 4 San Rosa Rd; 9698 Birdland Ct; 412 Boas Ave; 305 Hepburn Ave; 0 Whitfords Ave; 70, 31048 street not identified

Crown Reserve

Reserve 31048 (Recreation and Conservation of Flora and Fauna), 21708 (Protection of Flora and Fauna), 43290 (Conservation Park), 21176 (Forestry Purposes Pine Seedling Orchard)

CALM Managed Land

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Spearwood Dunes

Sands derived from Tamala Limestone (Qts: S7)

Tamala Limestone (Qtl: LS1, LS2)

Wetlands (within the Spearwood Dunes)

Holocene Swamp Deposits (Qrw: Sp1)

VEGETATION AND FLORA

Vegetation Complexes

Karrakatta Complex — Central and South

Cottesloe Complex — Central and South

Wetlands

Herdsmen Complex

Floristic Community Types:

Supergroup 2: Seasonal Wetlands

S7 Northern woodlands to forests over tall sedgeland alongside permanent wetlands

Supergroup 4: Uplands centred on Spearwood and Quindalup Dunes

25 Southern *Eucalyptus gomphocephala* — *Agonis flexuosa* woodlands

28 Spearwood *Banksia attenuata* or *B. attenuata* — *Eucalyptus* woodlands

WETLANDS

Wetland Types: lake, sumpland, river

Natural Wetland Groups

Spearwood Dunes

Yanchep (S.1)

Wetland Management Objectives: Conservation (779.7ha), not assessed

Swan Coastal Plain Lakes EPP: 638.1ha + 63.7ha + 8.2ha = 710ha (total)

THREATENED ECOLOGICAL COMMUNITIES

Not assessed, Not determined

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: open water, vegetated wetland, vegetated uplands



Vegetation and Flora: limited survey (DEP 1996 (Yela 01-03), DPUD 1992b, EPA and WAWA 1990)

Structural Units: mapping (DPUD 1992b, EPA and WAWA 1990)

Uplands: *Eucalyptus gomphocephala* Closed Forest to Woodland; *Eucalyptus gomphocephala* Tall Open Forest over *Banksia grandis* Low Open Forest; *Eucalyptus calophylla* Closed to Open Forest; *Banksia attenuata* and *Eucalyptus marginata* Woodland; Mixed *Eucalyptus marginata*, *E. calophylla* and *Banksia attenuata* Open Forest

Wetlands: *Eucalyptus rudis* Scattered Open Forest to Low Woodland; *Melaleuca raphiophylla* Low Open to Low Closed Forest; *Melaleuca raphiophylla* and *Banksia littoralis* Open Forest; Closed to Open Sedgeland dominated by *Schoenoplectus validus*, *Baumea articulata*; *B. juncea*, **Typha orientalis*, *Juncus pallidus* and *Lepidosperma longitudinale* or combinations of *Schoenoplectus validus* and *Baumea articulata*; Mixed Herbland (on dry lake bed)

Scattered Native Plants: not assessed

Vegetation Condition: >75% Very Good to Excellent, <25% Good to Degraded, with areas of severe localised disturbance

Total Flora: 86 native taxa, 24 weeds (plot-generated list only, DEP 1996)

Significant Flora: *Jacksonia sericea* (3); *Persicaria lapathifolia* (in Herblands on dry lake bed only record in the PMR)

Fauna: surveyed by RAOU (1996 D), 86 visits, and by Bamford and Bamford (1990) for birds (122). Significant populations of Blue-billed Duck, Musk Duck, Hardhead, Splendid and Variegated Fairy-wrens, Broad-tailed, Western and Yellow-rumped thornbills, Weebill, Scarlet Robin, Golden Whistler and Grey Shrike-thrush. Significant bird species: category 1 (3), category 2 (5), category 3 (17) and category 4 (8). Limited survey for native mammals (6), reptiles and amphibians (6) (DPUD 1991). Significant mammal species: Western Brush Wallaby and Echidna, Quenda (Friend 1996 D). Native fish species: Native Goby (*Pseudogobius olorum*) and Pygmy Perch (*Edelia vittata*) (WAWA 1995)

Linkage: adjacent bushland to the north (BS383, across road), east (BS164, across road) and west; part of proposed Greenways 42, 2, 6, 11 (Tingay, Alan & Associates 1997a); part of a regionally significant contiguous bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: recommended for protection in the study of City of Wanneroo bushland (Trudgen 1996); Included within Yellagonga Regional Park (DPUD, 1992b)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

ANCA Directory of Important Wetlands in Australia; Listed on the Register of the National Estate; Location for JAMBA/CAMBA species

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Rarity, 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 Coastal Plain Lakes EPP; location of Scheduled Fauna, conservation category wetlands; under MRS Parks and Recreation Reservation and TPS Landscape Zoning, Crown Reserve

Constraints: private land; under MRS Urban Zoning, MRD regional road requirements

Recommendation: The care, control and management of this area for conservation purposes within Yellagonga Regional Park is endorsed.

CONTI ROAD BUSHLAND, WANNEROO

Boundary Definition: bushland (part taken to cadastre)/management boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 164 **Map no.** 32 **Map sheet series ref. no.** 2034-I SW

Other Names: not known

Local Authorities (Suburb)

Shire of Wanneroo (Ashby)

Ownership Categories

Private, Local Government, State Government

Area (ha): total 32.9; bushland 30.9

Zoning

MRS: Urban, Urban Deferred

TPS: Rural

Lot/Location/Reserve numbers (Purpose),

Street name

9, 8027, 10668 Wanneroo Rd; 8121 Conti Rd; 7746

Ashley Rd; 500 Carosa Rd; Closed

Crown Reserve

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Spearwood Dunes

Sands derived from Tamala Limestone (Qts: S7)

VEGETATION AND FLORA

Vegetation Complexes

Spearwood Dunes

Karrakatta Complex — Central and South

Floristic Community Types

Supergroup 4: Uplands centred on Spearwood and Quindalup Dunes

28 Spearwood *Banksia attenuata* or *B. attenuata* — *Eucalyptus* woodlands

WETLANDS

No wetlands mapped

THREATENED ECOLOGICAL COMMUNITIES

Not assessed

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated uplands

Vegetation and Flora: limited survey (Gibson *et al.* 1994 (Depot 01); Mattiske Consulting Pty. Ltd. 1997)

Structural Units

Uplands: Mixed *Banksia attenuata*, *B. menziesii* and *Eucalyptus marginata* Woodland; *Eucalyptus calophylla* Woodland

Scattered Native Plants: *Eucalyptus marginata* Woodland

Vegetation Condition: Excellent to Good (Mattiske Consulting Pty. Ltd. 1997)

Total Flora: 38 native taxa (Gibson *et al.* 1994 (Depot 01); Mattiske Consulting Pty. Ltd. 1997) (estimated >20% expected flora)

Significant Flora: none recorded

Fauna: no known information

Linkage: adjacent bushland/canopy to the north, south and west (BS299, across road); part of proposed Greenway 2 (Tingay, Alan & Associates 1997a); part of a regionally significant contiguous bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: recommended for protection in the study of City of Wanneroo bushland (Trudgen 1996)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities

Opportunities and/or Constraints

Opportunities: Bushplan Site/part Bushplan Site under Crown Reserve

Constraints: private land; under MRS Urban Zoning and Urban Deferred Zoning, General Mineral Resource Area (sand)

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s). For existing crown reserve part of Bushplan Site: The existing care, control and management 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.

CAPORN STREET BUSHLAND, MARIGINIUP

Boundary Definition: bushland (part taken to cadastre and zoning) boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 469

Map no. 32

Map sheet series ref. no. 2034-I SW

Other Names: not known

Area (ha): total 11.1; bushland 10.6

Local Authorities (Suburb)

Zoning

Shire of Wanneroo (Mariginiup)

MRS: Rural, Important Regional Roads

TPS: Landscape, Rural



Ownership Categories
State Government

**Lot/Location/Reserve numbers (Purpose),
Street name**
38 Edward St
Crown Reserve

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Spearwood Dunes

Sands derived from Tamala Limestone (Qts: S7)

VEGETATION AND FLORA

Vegetation Complexes

Spearwood Dunes

Karrakatta Complex - Central and South

Floristic Community Types: *not sampled, type not inferred

Supergroup 4: Uplands centred on Spearwood and Quindalup Dunes

*28 Spearwood *Banksia attenuata* or *B. attenuata* — *Eucalyptus* woodlands

WETLANDS

No wetlands mapped

THREATENED ECOLOGICAL COMMUNITIES

Not assessed

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features

Vegetation and Flora: limited survey (DEP 1998)

Structural Units

Uplands: *Banksia attenuata*, *B. menziesii* and *B. illicifolia* Low Open Forest to Low Woodland with emergent *Eucalyptus marginata*; *Eucalyptus marginata*, *Banksia attenuata*, *B. menziesii* Low Open Forest to Woodland; *Eucalyptus calophylla* Open Forest to Woodland; *Banksia attenuata*, *B. menziesii*, *B. illicifolia* and *Allocasuarina fraseriana* Low Open Forest to Low Woodland with emergent *Eucalyptus marginata*

Scattered Native Plants: *Eucalyptus gomphocephala* Open Woodland

Vegetation Condition: >60% Excellent to Very Good, <10% Degraded to Completely Degraded, with areas of severe localised disturbance

Total Flora: not known

Significant Flora: none recorded

Fauna: no known information

Linkage: adjacent bushland/canopy to the south and east

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria met for inclusion: Representation of ecological communities, Criteria not relevant to determination of conservation value, but which may be applied when evaluating areas having similar values

Opportunities and/or Constraints

Opportunities: Bushplan Site/part Bushplan Site under TPS Landscape Zoning, Crown Reserve

Constraints: under MRD regional road requirements, General Mineral Resource Area (sand)

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s).

GARDEN PARK BUSHLAND, WANNEROO

Boundary Definition: bushland taken to cadastre and zoning 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. 470

Map no. 33

Map sheet series ref. no. 2034-I SW

Other Names: not known

Area (ha): total 5.9; bushland 5.1

Local Authorities (Suburb)

Zoning

Shire of Wanneroo (Wanneroo)

MRS: Rural

TPS: Special Rural



Ownership Categories
State Government

**Lot/Location/Reserve numbers (Purpose),
Street name**
10857 Casuarina Wy
Crown Reserve

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Spearwood Dunes

Sands derived from Tamala Limestone (Qts: S7)

VEGETATION AND FLORA

Vegetation Complexes

Spearwood Dunes

Karrakatta Complex - Central and South

Floristic Community Types: *not sampled, types not inferred

Supergroup 4: Uplands centred on Spearwood and Quindalup Dunes

*28 Spearwood *Banksia attenuata* or *B. attenuata* — *Eucalyptus* woodlands

WETLANDS

No wetlands mapped

THREATENED ECOLOGICAL COMMUNITIES

Not assessed

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features

Vegetation and Flora: limited survey (DEP 1998, fenceline survey)

Structural Units

Uplands: *Banksia attenuata*, *B. menziesii* and *B. illicifolia* Low Open Forest to Low Woodland with emergent *Eucalyptus marginata*; *Eucalyptus marginata*, *Banksia attenuata*, *B. menziesii* Low Open Forest to Woodland; *Eucalyptus calophylla* Open Forest to Woodland

Scattered Native Plants: *Eucalyptus gomphocephala* Open Woodland

Vegetation Condition: >90% Excellent to Very Good, with areas of severe localised disturbance

Total Flora: not known

Significant Flora: none recorded

Fauna: no known information

Linkage: adjacent bushland to the north and east

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria met for inclusion: Representation of ecological communities, Criteria not relevant to determination of conservation value, but which may be applied when evaluating areas having similar values

Opportunities and/or Constraints

Opportunities: Bushplan Site/part Bushplan Site under Crown Reserve

Constraints: under General Mineral Resource Area (sand)

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s).

HIGH ROAD BUSHLAND, WANNEROO

Boundary Definition: bushland (part taken to cadastre and zoning)/bushland group boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 471 **Map no.** 39

Map sheet series ref. no. 2034-II NW

Area (ha): total 45.0; bushland 41.8

Other Names: not known

Local Authorities (Suburb)

Shire of Wanneroo (Wanneroo)

Zoning

MRS: Urban, Rural, Public Purposes-Water Authority of WA

TPS: Landscape, Parks and Recreation, Rural

Ownership Categories

Private, State Government, Local Government

Lot/Location/Reserve numbers (Purpose),

Street name

10135 Chicquita Pl; 2, 6904 Belgrade Rd; 10130

Benmuni Rd; 29, 30, 31, 32, 33, 34 Elliot Rd

Crown Reserve



SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Spearwood Dunes

Sands derived from Tamala Limestone (Qts: S7)

Wetlands (within the Spearwood Dunes)

Holocene Swamp Deposits (Qhw: Cps) (not mapped under Wetlands or vegetation observed)

VEGETATION AND FLORA

Vegetation Complexes

Spearwood Dunes

Karrakatta Complex - Central and South

Floristic Community Types: *not sampled, types not inferred

Supergroup 4: Uplands centred on Spearwood and Quindalup Dunes

*28 Spearwood *Banksia attenuata* or *B. attenuata* — *Eucalyptus* woodlands

WETLANDS

No wetlands mapped

THREATENED ECOLOGICAL COMMUNITIES

Not assessed

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated uplands

Vegetation and Flora: limited survey (DEP 1998, surveyed from roadside)

Structural Units

Uplands: *Banksia illicifolia*, *B. attenuata* Low Open Woodland; *Banksia attenuata*, *B. menziesii* and *Allocasuarina fraseriana* Low Woodland to Open Low Forest sometimes with scattered emergent trees of *Eucalyptus marginata*;

Banksia attenuata Low Open Woodland with emergent trees of *Eucalyptus gomphocephala*

Vegetation Condition: >80% Excellent to Very Good, <15% Good to Degraded, with areas of severe localised disturbance

Total Flora: not known

Significant Flora: none recorded

Fauna: no known information

Linkage: adjacent bushland to the north, south, east and west

Other Special Attributes: majority recommended for protection in the study of City of Wanneroo bushland (Trudgen 1996)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria met for inclusion: Representation of ecological communities, Criteria not relevant to determination of conservation value, but which may be applied when evaluating areas having similar values

Opportunities and/or Constraints

Opportunities: Bushplan Site/part Bushplan Site under TPS Parks and Recreation Zoning and Landscape Zoning, Crown Reserve

Constraints: private land; under MRS Urban Zoning, General Mineral Resource Area (sand)

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s).

MARIGINIUP LAKE AND ADJACENT BUSHLAND, MARIGINIUP

Boundary Definition: protected area boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 147 **Map no.** 32, 33 **Map sheet series ref. no.** 2034-I SW

System 6 (1983): Part M8 part System area bushland, only bushland described

Other Names

Mariginiup Lake, part Submission Area 233

Local Authorities (Suburb)

Shire of Wanneroo (Mariginiup)

Area (ha): total 217.4 (includes open water); bushland 53.5

Zoning

MRS: Parks and Recreation

TPS: Landscape



Ownership Categories
State Government, Private

**Lot/Location/Reserve numbers (Purpose),
Street name**
3, 39, 102, 103, 302, 303 Pinjar Rd; 5, 6, 10, 11, 1395,
11142 Ranch Rd; 10916 Rowley Pl; 14, 400, 1133
Honey St; 40, 44 Caporn St; 42, 44, 88 Wade St; 101
Lake St; 46, 104 Tapping St; 46, 47 Wells St; 50 street
not identified
Crown Reserve

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Spearwood Dunes

Sands derived from Tamala Limestone (Qts: S7)

Wetlands (within the Spearwood Dunes)

Holocene Swamp Deposits (Qhw: Cps)

VEGETATION AND FLORA

Vegetation Complexes

Spearwood Dunes

Karrakatta Complex — Central and South

Wetlands

Pinjar Complex

Floristic Community Types: not sampled, types not inferred

Supergroup 2: Seasonal Wetlands

WETLANDS

Wetland Types: lake, sumpland, artificial channel

Natural Wetland Groups

Bassendean Dunes

Gnangara (B.2)

Wetland Management Objectives: Conservation (162.5ha)

Swan Coastal Plain Lakes EPP: 138.4ha + 21.5ha = 159.9ha (total)

THREATENED ECOLOGICAL COMMUNITIES

Not determined

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: open water, vegetated wetland, vegetated uplands

Vegetation and Flora: limited survey (EPA and WAWA 1990), McArthur and Mattiske 1985, Trudgen 1993a, WAWA 1995)

Structural Units: mapping (EPA and WAWA 1990, McArthur and Mattiske 1985, Trudgen 1993a)

Uplands: *Eucalyptus marginata* Open Woodland to Open Forest; *Banksia attenuata* and *B. menziesii* Low Open Woodland to Low Open Forest; *Acacia saligna* Low Shrubland

Wetlands: *Eucalyptus calophylla* and *E. rudis* Closed Forest; *Melaleuca raphiophylla* Low Woodland to Low Closed Forest; *Baumea articulata* Closed Sedgeland

Scattered Native Plants: *Eucalyptus marginata* Open Woodland

Vegetation Condition: >40% Very Good to Excellent; <60% Degraded to Completely Degraded, with areas of severe localised disturbance (Trudgen 1993a)

Total Flora: not known

Significant flora: none recorded

Fauna: no known information

Linkage: adjacent bushland/canopy to the north, south and west; part of proposed Greenways 16, 17 (Tingay, Alan & Associates 1997a); part of a regionally significant fragmented bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: recommended for protection in the study of City of Wanneroo bushland (Trudgen 1996)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed; Indicative Place of the Register of the National Estate

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, 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 Coastal Plain Lakes EPP; location of conservation category wetlands; under MRS Parks and Recreation Reservation and TPS Landscape Zoning, Crown Reserve

Constraints: private land; under General Mineral Resource Area (sand)

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s).

WOODVALE NATURE RESERVE, WOODVALE

Boundary Definition: protected area boundary (Areas of bushland within the boundaries of the Bushplan Site are not accurately mapped.)

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 407 **Map no.** 38 **Map sheet series ref. no.** 2034-II NW

System 6 (1983): Part M7 all System area bushland, total area described

Other Names

CALM Woodvale

Local Authorities (Suburb)

City of Joondalup (Woodvale)

Ownership Categories

Not identified

CALM Managed Land

Area (ha): total 37.5; bushland 35.6

Zoning

MRS: Parks and Recreation

TPS: Landscape

Lot/Location/Reserve numbers (Purpose),

Street name

7812 Ocean Reef Rd

Crown Reserve

Reserve 30809 (Research and Conservation of Flora and Fauna)

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Spearwood Dunes

Sands derived from Tamala Limestone (Qts: S7)

VEGETATION AND FLORA

Vegetation Complexes

Spearwood Dunes

Karrakatta Complex — Central and South

Cottesloe Complex — Central and South

Floristic Community Types

Supergroup 4: Uplands centred on Spearwood and Quindalup Dunes

28 Spearwood *Banksia attenuata* or *B. attenuata* — *Eucalyptus* woodlands

WETLANDS

No wetlands mapped

THREATENED ECOLOGICAL COMMUNITIES

Not assessed

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated uplands

Vegetation and Flora: detailed survey (Keighery, GJ, and Langley 1994); limited survey (Gibson *et al.* 1994 (Woodv 01-02))

Structural Units

Uplands: Low Woodland dominated by *Banksia attenuata*, *B. menziesii* and *Allocasuarina fraseriana* which is, at times, dominated by *Eucalyptus gomphocephala* Open Woodland

Scattered Native Plants: *Eucalyptus gomphocephala* Open Woodland

Vegetation Condition: >80% Very Good, <20% Good to Degraded, with areas of severe localised disturbance

Total Flora: 170 native taxa, 37 weeds (Keighery, GJ, and Langley 1994) (estimated >80% expected flora)

Significant Flora: *Jacksonia sericea* (3); *Ricinocarpus glaucus*

Fauna: structured surveys by CALM (How & Dell 1994) for reptiles (18) and amphibians (4). Significant reptile species: gecko (*Diplodactylus polyophthalmus*), Black Monitor (*Varanus tristis*) and Carpet Python (*Morelia spilota*). Good assemblage of insectivorous and nectarivorous birds (J. Dell pers. comm.). Significant mammal species: Quenda (Friend 1996 D)

Linkage: no adjacent bushland; part of proposed Greenways 6, 10 (Tingay, Alan & Associates 1997a); part of a regionally significant fragmented bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: recommended for protection in study of City of Wanneroo bushland (Trudgen 1996)



SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Listed on the Register of the National Estate

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities

Opportunities and/or Constraints

Opportunities: Bushplan Site/part Bushplan Site location of Scheduled Fauna; under MRS Parks and Recreation Reservation and TPS Landscape Zoning, Crown Reserve

Recommendation: The existing purpose, care, control and management of Reserve 30809 is endorsed.

WHITFORDS AVENUE BUSHLAND, CRAIGIE/PADBURY

Boundary Definition: protected area/bushland (part taken to cadastre and zoning)boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 303 **Map no. 38, 44** **Map sheet series ref. no. 2034-II NW**

Other Names

Submission Areas 146 and 159 Pinnaroo, Beenyup, Hepburn Conservation Reserve and Submission Area 160 Craigie bushland; Hepburn Heights; Pinnaroo Cemetery; Craigie Open Space

Local Authorities (Suburb)

City of Joondalup (Craigie, Padbury)

Area (ha): total 252.6; bushland 215.1

Zoning

MRS: Public Purposes-Water Authority, Urban, Parks and Recreation, Controlled Access Highways, Important Regional Roads, Public Purposes-Special Uses

TPS: Landscape, Residential Development, Special Development A, Special Zone

Ownership Categories

State Government, Local Government, Not identified

Lot/Location/Reserve numbers (Purpose), Street name

8850 Copperhead Ave; 9205, 11898, 11899, 11900 Hepburn Ave; 9976 Holleton Tce; 9067, 9959, 10270, 10989 Leviathan Wy; 8278 Mitchell Fwy; 8889, 9067, 9097, 11401 Whitfords Ave; 9097, 9959, 11398 Pinnaroo Dr; 10988 Stanley Pl; 10084, 12649 street not identified
Crown Reserve

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Spearwood Dunes

Sands derived from Tamala Limestone (Qts: S7)

Tamala Limestone (Qtl: LS1)

Quindalup Dunes (Holocene Dunes)

Safety Bay Sands (Qhs: S2, LS4)

VEGETATION AND FLORA

Vegetation Complexes

Spearwood Dunes

Karrakatta Complex — Central and South

Cottesloe Complex — Central and South

Floristic Community Types

Supergroup 4: Uplands centred on Spearwood and Quindalup Dunes

24 Northern Spearwood shrublands and woodlands

26b Woodlands and mallees on limestone

28 Spearwood *Banksia attenuata* or *B. attenuata* — *Eucalyptus* woodlands

29a Coastal shrublands on shallow sands

WETLANDS

No wetlands mapped

THREATENED ECOLOGICAL COMMUNITIES

Not assessed



SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: limestone ridge, tall dune, vegetated uplands

Vegetation and Flora: detailed survey (part Bushplan Site, Hepburn Heights — Keighery, GJ, 1991b, Tingay, Alan & Associates 1991a ; Craigie Open Space — Allen *et al.* 1994); limited survey (DEP 1996 (Hepb 01-03), (Pinn 01-03); Pinnaroo Cemetery — Foulds 1987)

Structural Units: mapping (part Bushplan Site, Craigie Open Space — Allen *et al.* 1994; part Bushplan Site — Hepburn Heights, Pinnaroo Cemetery and Craigie Open Space: Semeniuk, V&C Research Group 1991a; part Bushplan Site — Hepburn Heights and Pinnaroo Cemetery — Tingay, Alan & Associates 1991a)

Quindalup Dunes

Uplands: *Melaleuca acerosa* and *Acacia lasiocarpa* Open Low Heath; *Eucalyptus gomphocephala* Woodland; *Banksia prionotes* Woodland

Spearwood Dunes

Uplands - Sands derived from Tamala Limestone: Open Forest to Woodland dominated by *Eucalyptus marginata*, *E. calophylla* or *E. gomphocephala*; Low Woodland to Open Low Woodland dominated by *Banksia attenuata*, *B. menziesii*, *B. prionotes* or *Allocasuarina fraseriana* and combinations of these (these areas may contain scattered emergent *Eucalyptus marginata* or *E. gomphocephala*); *Acacia saligna* Shrubland; *Acacia rostellifera* Shrubland

Uplands - Tamala Limestone: *Eucalyptus decipiens* Low Woodland; *Acacia rostellifera* Shrubland; *Acacia truncata* Shrubland; *Dryandra sessilis* var. *cygnorum* Closed Heath; *Lepidosperma gladiatum* Sedgeland

Scattered Native Plants: *Eucalyptus gomphocephala* Woodland

Vegetation Condition: >70% Very Good to Excellent, <30% Good to Degraded, with areas of severe localised disturbance

Total Flora: 235 native taxa, 66 weeds (compiled from Allen *et al.* 1994, Foulds 1987, Keighery, GJ, 1991b, Tingay, Alan and Associates 1991a) (estimated >85% of expected flora)

Significant Flora: *Sarcozona bicarinata* (3), *Jacksonia sericea* (3); *Lechenaultia linarioides*, *Ricinocarpus glaucus*, *Callitris preissii* (most northern population on the Plain); typical Tamala Limestone taxa: *Grevillea preissii*, *Diplopeltis huegelii*, *Trymalium ledifolium* subsp. *ledifolium*

Fauna: multiple and structured surveys by Western Australian Museum of Natural Science and Edith Cowan University (Allen *et al.* 1994) for birds (36), native mammals (3), reptiles (19) and amphibians (2) (How *et al.* 1996). Significant bird species: category 3 (6) including Grey Shrike-thrush, Weebill, Yellow-rumped and Western thornbills and Splendid Fairy-wren, and category 4 (2). Significant mammal species: Western Brush Wallaby, Quenda (Friend 1996 D). Significant reptile species: Two-striped Snake (*Simoselaps bimaculata*) and Half-ringed Snake (*S. semifasciata*)

Linkage: no adjacent bushland; part of a regionally significant fragmented bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: recommended for protection in study of City of Wanneroo bushland (Trudgen 1996); contains Quindalup/Spearwood Dunes System interface; Quindalup Dunes at 9kms from the coast; part Bushplan Site recommended for conservation by Semeniuk, V&C Research Group (1991a); part of proposed Greenways 10, 11 (Tingay, Alan & Associates 1997a)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Interim List of the Register of the National Estate

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

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

Opportunities and/or Constraints

Opportunities: Bushplan Site/part Bushplan Site under MRS Parks and Recreation Reservation and TPS Landscape Zoning, Crown Reserve

Constraints: under MRS Urban Zoning, MRD regional road requirements

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s). This may include — The existing care, control and management intent of the reserve is endorsed. Long-term security and support for conservation management of the Bushplan Site be enhanced by: amending the purpose of the reserve to include conservation; and applying appropriate mechanisms in consultation with the reserve management body.

SHEPHERDS BUSH RESERVE, KINGSLEY

Boundary Definition: bushland (part taken to cadastre) boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 39

Map no. 38, 44

Map sheet series ref. no. 2034-II NW

Other Names: not known

Area (ha): total 16.9; bushland 15.2

Local Authorities (Suburb)
City of Joondalup (Kingsley)

Ownership Categories
State Government, Local Government, Not identified

Zoning
MRS: Urban
TPS: Residential Development
Lot/Location/Reserve numbers (Purpose), Street name
661, 10878 Barridale Dr; 7265, 10406, 10930, 10931
Shepherds Bush Dr; 397 Newhaven Pl
Crown Reserve

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Spearwood Dunes
Sands derived from Tamala Limestone (Qts: S7)

VEGETATION AND FLORA

Vegetation Complexes

Spearwood Dunes
Karrakatta Complex — Central and South

Floristic Community Types: *not sampled, types not inferred

Supergroup 4: Uplands centred on Spearwood and Quindalup Dunes

*24 Northern Spearwood shrublands and woodlands

*28 Spearwood *Banksia attenuata* or *B. attenuata* — *Eucalyptus* woodlands

WETLANDS

No wetlands mapped

THREATENED ECOLOGICAL COMMUNITIES

Not determined

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: limestone ridge, vegetated uplands

Vegetation and Flora: limited survey (Tingay, Alan and Associates 1991a; DEP 1996)

Structural Units

Uplands: *Eucalyptus marginata* Open Forest to Woodland; *Eucalyptus gomphocephala* Woodland; *Eucalyptus gomphocephala* Woodland over *Dryandra sessilis* var. *cygnorum* or *Jacksonia furcellata* Shrubland; *Banksia attenuata* and *B. menziesii* Woodland with scattered emergent *Eucalyptus marginata* and *E. gomphocephala*

Scattered Native Plants: *Eucalyptus gomphocephala* Woodland

Vegetation Condition: >75% Very Good to Good, <25% Degraded, with areas of severe localised disturbance

Total Flora: not known

Significant Flora: not surveyed

Fauna: no known information

Linkage: no adjacent bushland

Other Special Attributes: recommended for protection in study of City of Wanneroo bushland (Trudgen 1996).

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Criteria not relevant to determination of conservation value, but which may be applied when evaluating areas having similar values

Opportunities and/or Constraints

Opportunities: Bushplan Site/part Bushplan Site under Crown Reserve

Constraints: under MRS Urban Zoning

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.

BADGERUP LAKE AND ADJACENT BUSHLAND, WANNEROO

Boundary Definition: protected area/bushland (part taken to cadastre)/bushland group boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 327

Map no. 39

Map sheet series ref. no. 2034-II NW

System 6 (1983): Part M8 part System area bushland, only bushland described

Other Names: not known

Area (ha): total 147.0 (includes open water); bushland 95.9

Local Authorities (Suburb)

Shire of Wanneroo (Wanneroo)

Zoning

MRS: Important Regional Roads, Parks and Recreation, Rural

TPS: Rural, Landscape, Special Rural

Ownership Categories

State Government, Private, Local Government

Lot/Location/Reserve numbers (Purpose),

Street name

5, 6, 8, 9, 10, 14, 1676, 12151 Mary St; 4, 774, 11921, 12421 Badgerup Rd; 66, 67 Nicholas Rd; 37 Elliot Rd; 10843 Jambanis Rd; 672, 740, 2451, 9375, 1687, 1688, 10842, 12727 Benmuni Rd; 196, 197 Shillington Wy; 2384, 2385 Stafford Wy; 8162 street not identified
Crown Reserve

SECTION 2: REGIONAL INFORMATION

Spearwood Dunes (near interface of Bassendean and Spearwood Dunes)

Sands derived from Tamala Limestone (Qts: S7)

Wetlands (within the Spearwood Dunes)

Holocene Swamp Deposits (Qhw: Cps)

VEGETATION AND FLORA

Vegetation Complexes

Spearwood Dunes

Karrakatta Complex — Central and South (near interface of Bassendean Complex — Central and South and Karrakatta Complex — Central and South)

Wetlands

Herdsmen Complex

Floristic Community Types: *not sampled, types not inferred

Supergroup 2: Seasonal Wetlands

Supergroup 4: Uplands centred on Spearwood and Quindalup Dunes

*24 Northern Spearwood shrublands and woodlands

*28 Spearwood *Banksia attenuata* or *B. attenuata* — *Eucalyptus* woodlands

WETLANDS

Wetland Types: sumpland

Natural Wetland Groups

Bassendean Dunes

Gnangara (B.2)

Wetland Management Objectives: Conservation (28.5ha)

Swan Coastal Plain Lakes EPP: 8.7ha + 17.6ha = 26.3ha (total)

THREATENED ECOLOGICAL COMMUNITIES

Not assessed, Not determined

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: open water, vegetated wetland, vegetated uplands

Vegetation and Flora: mapping (DEP 1998 (part surveyed from roadside), EPA and WAWA 1990, Trudgen 1993a)

Structural Units: limited survey (EPA and WAWA 1990, Trudgen 1993a)

Uplands: *Eucalyptus marginata* Open Forest to Closed Forest; *Banksia attenuata* and *B. menziesii* Low Open Forest; *Banksia attenuata*, *B. menziesii*, *Eucalyptus todtiana* and *Nuytsia floribunda* Low Open Woodland to Low Woodland; *Banksia attenuata*, *B. menziesii* and *Allocasuarina fraseriana* Low Open Forest; *Banksia menziesii* and *Allocasuarina fraseriana* Low Open Woodland to Low Open Forest; *Banksia attenuata*, *B. menziesii* and *B. illicifolia* Low Open Woodland to Low Open Forest; *Stirlingia latifolia*, *Allocasuarina humilis*, *Gompholobium tomentosum* Low Shrubland; *Stirlingia latifolia*, *Hibbertia hypericoides* and *Xanthorrhoea preissii* Shrubland; *Hibbertia racemosa* and *Hakea prostrata* Low Shrubland

Wetlands: *Eucalyptus rudis* Closed Forest; *Melaleuca raphiophylla* Low Closed Forest; *Banksia attenuata*, *B. menziesii*, *Melaleuca preissiana*, *Eucalyptus todtiana* and *Nuytsia floribunda* Low Open Woodland to Low Woodland; *Isolepis nodosus* Closed Sedgeland; *Baumea juncea* Closed Sedgeland; mixed Closed Sedgeland

Scattered Native Plants: not assessed

Vegetation Condition: <60% Very Good, >40% Good with areas of severe localised disturbance

Total Flora: not known

Significant Flora: *Jacksonia sericea* (3)

Fauna: no systematic survey. Significant mammal species: Quenda (Friend 1996 D)

Linkage: adjacent bushland to the north, south, east and west; part of proposed Greenway 15 (Tingay, Alan & Associates 1997a)

Other Special Attributes: recommended for protection in study of City of Wanneroo bushland (Trudgen 1996)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed, Indicative Place of the Register of the National Estate

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Rarity, 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

Opportunities and/or Constraints

Opportunities: Bushplan Site/part Bushplan Site subject to Swan Coastal Plain Lakes EPP; location of conservation category wetlands; under MRS Parks and Recreation Reservation and TPS Landscape Zoning, Crown Reserve

Constraints: private land; under MRD regional road requirements, Priority and General Mineral Resource Area (sand)

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s).

STARLIGHT GROVE BUSHLAND, GNANGARA/WANGARA

Boundary Definition: bushland (part taken to cadastre)/bushland group boundary (Areas of bushland within the boundaries of the Bushplan Site are not accurately mapped.)

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 463 **Map no.** 39 **Map sheet series ref. no.** 2034-II NW

Other Names: not known **Area (ha):** total 34.7; bushland 30.9

Local Authorities (Suburb)

Shire of Wanneroo (Wangara, Gngangara)

Zoning

MRS: Industrial, Rural, Important Regional Roads

TPS: General Industry, Landscape, Rural, Special Rural

Lot/Location/Reserve numbers (Purpose),

Street name

2 Callaway St; 6, 7 Sydney St

Ownership Categories

State Government, Private (commercial organisation)

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Spearwood Dunes

Sands derived from Tamala Limestone (Qts: S7)

Wetlands (within the Spearwood Dunes)

Holocene Swamp Deposits (Qhw: Cps)

VEGETATION AND FLORA

Vegetation Complexes

Spearwood Dunes

Karrakatta Complex — Central and South

Floristic Community Types: not sampled, types not inferred.

Supergroup 2: Seasonal Wetlands

Supergroup 4: Uplands centred on Spearwood and Quindalup Dunes AND/OR

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau

WETLANDS

Wetland Types: sumpland

Natural Wetland Groups

Bassendean Dunes

Gngangara (B.2)

Wetland Management Objectives: Conservation (0.2ha)

Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Not determined

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated wetlands, vegetated uplands

Vegetation and Flora: limited survey (DEP 1998, from adjacent land holding)

Structural Units

Uplands: *Eucalyptus marginata* Open Forest to Closed Forest; *Banksia attenuata* and *B. menziesii* Low Open Forest

Wetlands: not known

Vegetation Condition: Excellent (area greater than Bushplan Site, Mattiske Consulting Pty Ltd 1997)

Total Flora: not known

Significant Flora: none recorded

Fauna: no known information

Linkage: adjacent bushland to the north, south, east and west

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities

Opportunities and/or Constraints

Opportunities: Bushplan Site/part Bushplan Site location of conservation category wetland; under TPS Landscape Zoning

Constraints: private land; under MRS Industrial zoning, MRD regional road requirements, General and Priority Mineral Resource Area (sand)

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s).

DECOURCEY WAY BUSHLAND, MARANGAROO

Boundary Definition: protected area/bushland boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 328

Map no. 45

Map sheet series ref. no. 2034-II NW

System 6 (1983): M12 part System area bushland, only bushland described

Other Names

Marangaroo Golf Course

Local Authorities (Suburb)

Shire of Wanneroo (Marangaroo, Madeley)

Area (ha): total 32.8; bushland 32.8

Zoning

MRS: Parks and Recreation, Urban, Important Regional Roads

TPS: Rural, Residential Development

Lot/Location/Reserve numbers (Purpose),

Street name

11139 Brookland Cr; 500, 12651 street not identified

Crown Reserve

Ownership Categories

Local Government, State Government

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Spearwood Dunes

Sands derived from Tamala Limestone (Qts: S7)

VEGETATION AND FLORA

Vegetation Complexes

Spearwood Dunes

Karrakatta Complex — Central and South

Floristic Community Types

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau

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

WETLANDS

No wetlands mapped

THREATENED ECOLOGICAL COMMUNITIES

Endangered (floristic community type 20a)

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated uplands

Vegetation and Flora: limited survey (Gibson *et al.* 1994 (Golf 01))

Structural Units: *Banksia attenuata* Low Woodland with scattered emergent *Eucalyptus marginata* over species-rich Mixed Low Open Heath

Vegetation Condition: >75% Very Good, <25% Good, with areas of severe localised disturbance

Total Flora: 56 native taxa, 7 weeds (plot-generated list only) (estimated >50% expected flora)

Significant Flora: none recorded

Fauna: multiple and structured surveys by Western Australian Museum of Natural Science for birds (28), native mammals (1), reptiles (13) and amphibians (1) (How *et al.* 1996). Significant bird species: category 1 (1), category 3 (1) and category 4 (1)

Linkage: adjacent bushland/canopy to the east; part of proposed Greenway 11 (Tingay, Alan & Associates 1997a)

Other Special Attributes: recommended to be declared as an A-class Nature Reserve for the protection of flora and fauna in Gibson *et al.* 1994; recommended for protection in study of City of Wanneroo bushland (Trudgen 1996); Threatened or Poorly Reserved Plant Community (EPA 1994 GIS)

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

Opportunities and/or Constraints

Opportunities: Bushplan Site/part Bushplan Site location of Scheduled Fauna; under MRS Parks and Recreation Reservation, Crown Reserve

Constraints: under MRS Urban Zoning, MRD regional road requirements

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s). This may include — The existing care, control and management intent of the reserve is endorsed. Long-term security and support for conservation management of the Bushplan Site be enhanced by: amending the purpose of the reserve to include conservation; and applying appropriate mechanisms in consultation with the reserve management body.

LANDSDALE ROAD BUSHLAND, LANDSDALE

Boundary Definition: protected area boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 199 **Map no.** 45 **Map sheet series ref. no.** 2034-II NW

Other Names: Landsdale Road Conservation Park

Area (ha): total 16.23; bushland 15.78

Local Authorities (Suburb)

Zoning

Shire of Wanneroo (Darch)

MRS: Urban, Parks and Recreation

TPS: Rural, Landscape

Ownership Categories

Lot/Location/Reserve numbers (Purpose),

State Government

Street name

10143 Landsdale Rd

Crown Reserve

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Spearwood Dunes

Sands derived from Tamala Limestone (Qts: S7)

VEGETATION AND FLORA

Vegetation Complexes

Spearwood Dunes

Karrakatta Complex — Central and South

Floristic Community Types

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau

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

WETLANDS

No wetlands mapped

THREATENED ECOLOGICAL COMMUNITIES

Endangered (floristic community type 20a)

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated uplands

Vegetation and Flora: limited survey (Gibson *et al.* 1994 (Land01), Landsdale Farm School 1995)

Structural Units



Uplands: *Banksia attenuata* and *B. menziesii* Low Woodland with scattered emergent *Eucalyptus marginata* over species-rich Mixed Low Open Heath

Vegetation Condition: >90% Excellent, <10% Very Good

Total Flora: 95 native taxa, 4 weeds (compiled from Gibson *et al.* 1994 D, Landsdale Farm School 1995) (estimated >50% expected flora)

Significant Flora: *Cyathochaeta clandestina* (uncommon on west of the Plain in the PMR)

Fauna: multiple and structured surveys by Western Australian Museum of Natural Science for birds (25), native mammals (2), reptiles (19) and amphibians (2) (How *et al.* 1996). Significant bird species: category 1 (1) and category 4 (1). Significant mammal species: Quenda and Western Brush Wallaby. Significant reptile species: Black-striped Snake (*Simoselaps calanotos*). Rich reptile assemblage including Western Blue Tongue (*Tiliqua occipitalis*), Black Monitor (*Varanus tristis*) and a skink (*Morethia lineocellata*)

Linkage: adjacent bushland to the north, south and west; part of proposed Greenway 11 (Tingay, Alan & Associates 1997a)

Other Special Attributes: recommended to be declared as an A-class Nature Reserve for the protection of flora and fauna in Gibson *et al.* 1994; recommended for protection in study of City of Wanneroo bushland (Trudgen 1996); National Trust of Australia (WA) Classification

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, Criteria not relevant to determination of conservation value, but which may be applied when evaluating areas having similar values

Opportunities and/or Constraints

Opportunities: Bushplan Site/part Bushplan Site location of Scheduled Fauna; under MRS Parks and Recreation Reservation and TPS Landscape Zoning, Crown Reserve

Constraints: under MRS Urban Zoning

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.

WARWICK OPEN SPACE

Boundary Definition: protected area/bushland taken to cadastre boundary (Areas of bushland within the boundaries of the Bushplan Site are not accurately mapped.)

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 202 **Map no.** 44, 45 **Map sheet series ref. no.** 2034-II NW

System 6 (1983): M11 part System area bushland, only bushland described

Other Names: not known

Area (ha): total 74.1; bushland 58.1

Local Authorities (Suburb)

Zoning

City of Joondalup (Warwick, Hamersley)

MRS: Parks and Recreation, Other Major Highways, Important Regional Roads, Public Purposes-High School

TPS: Landscape

Ownership Categories

Lot/Location/Reserve numbers (Purpose),

Local Government, State Government

Street name

1 Erindale Rd; 145 Beach Rd

Crown Reserve

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Spearwood Dunes

Sands derived from Tamala Limestone (Qts: S7)

VEGETATION AND FLORA

Vegetation Complexes

Spearwood Dunes

Karrakatta Complex — Central and South

Floristic Community Types

Supergroup 4: Uplands centred on Spearwood and Quindalup Dunes

28 Spearwood *Banksia attenuata* or *B. attenuata* — *Eucalyptus* woodlands



WETLANDS

No wetlands mapped

THREATENED ECOLOGICAL COMMUNITIES

Not assessed

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated uplands

Vegetation and Flora: limited survey (City of Wanneroo 1995a, Gibson *et al.* 1994 (Wari 01--02))

Structural Units

Uplands: *Eucalyptus gomphocephala* Woodland over *Banksia attenuata* Low Open Woodland; *Eucalyptus marginata* and *Banksia attenuata* Woodland

Scattered Native Plants: not assessed

Vegetation Condition: mapping (City of Wanneroo 1995a) >75% Very Good to Excellent, <25% Good to Degraded, with areas of severe localised disturbance

Total Flora: 118 native taxa, 31 weeds (compiled from Gibson *et al.* 1994D and City of Wanneroo 1995a) (estimated >80% expected flora)

Significant Flora: *Jacksonia sericea* (3)

Fauna: multiple and structured surveys by Western Australian Museum of Natural Science for birds (23) and reptiles (12) (How *et al.* 1996). Significant bird species: category 1 (1), category 3 (2), category 4 (1). Breeding site for Brown Goshawk, Rainbow Bee-eater, Grey Butcherbird and several hollow-nesting species. The gecko, *Diplodactylus polyopthalmus*, is rare elsewhere on the Swan Coastal Plain. Important site for Western Jewel Butterfly and Sciron Skipper (Williams *et al.* pers. comm.)

Linkage: no adjacent bushland; part of proposed Greenways 12, 34 (Tingay, Alan & Associates 1997a); part of a regionally significant potential bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: recommended for protection in study of City of Wanneroo bushland (Trudgen 1996)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Rarity, Criteria not relevant to determination of conservation value, but which may be applied when evaluating areas having similar values

Opportunities and/or Constraints

Opportunities: Bushplan Site/part Zoningplan Site location of Scheduled Fauna; under MRS Parks and Recreation Reservation and TPS Landscape Zoning, Crown Reserve

Constraints: 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.

KOONDOOLA OPEN SPACE

Boundary Definition: protected area boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 201 **Map no.** 45, 46 **Map sheet series ref. no.** 2034-II NE, 2034-II NW

Other Names: not known

Area (ha): total 135.1; bushland 123.5

Local Authorities (Suburb)

Zoning

Shire of Wanneroo (Koondoola); City of Stirling (Koondoola)

MRS: Parks and Recreation, Important Regional Roads

Ownership Categories

TPS: Landscape

State Government

Lot/Location/Reserve numbers (Purpose), Street name

4, 86, 8899 Waddington Cr; 4 Marangaroo Dr; 0, 2, 109 Alexander Dr; 0, 1 Beach Rd

Crown Reserve

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Bassendean Dunes

Bassendean Sands (Qpb: S8)



Spearwood Dunes

Sands derived from Tamala Limestone (Qts: S7)

Wetlands (within the Spearwood Dunes)

Holocene Swamp Deposits (Qhw: Cps)

VEGETATION AND FLORA

Vegetation Complexes

Spearwood Dunes

Karrakatta Complex — Central and South

Floristic Community Types: *not sampled, type inferred

Supergroup 2: Seasonal Wetlands

*11 Wet forests and woodlands

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau

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

WETLANDS

Wetland Types: sumpland

Natural Wetland Groups

Bassendean—Pinjarra transition OR Bassendean with fluvial features

Bennet Brook (B/P.4)

Bassendean Dunes

Jandakot (B.3)

Wetland Management Objectives: Conservation (2.3ha), Resource Enhancement

Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Not assessed, Endangered (floristic community type 20a)

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: tall dune, vegetated wetland, vegetated uplands

Vegetation and Flora: limited survey (City of Wanneroo 1995b, Coalition for Wanneroo's Environment 1993, Gibson *et al.* 1994 (Koon 01-02), Wake 1995)

Structural Units: mapping (City of Wanneroo 1995b)

Uplands: *Banksia attenuata*, *B. menziesii* and *Allocasuarina fraseriana* Low Woodland to Low Open Woodland with scattered emergent *Eucalyptus marginata*, *Eremaea pauciflora*, *Melaleuca scabra* and *Leocopogon conostephioides* Shrubland

Wetlands: *Eucalyptus rudis* and *Melaleuca preissiana* Woodland; *Astartea aff. fascicularis* Heath over *Baumea articulata* and *Juncus pallidus* Sedgeland

Scattered Native Plants: not assessed

Vegetation Condition: mapping (City of Wanneroo 1995b)

>75% Excellent to Very Good with <25% Good to Degraded, with areas of severe localised disturbance

Total Flora: 175 native taxa, 17 weeds (estimated >70% expected flora, Wake 1995)

Significant Flora: *Jacksonia sericea* (3); *Verticordia drummondii* (poorly conserved in the PMR, E. George pers. comm.), *Verticordia nitens* (most western occurrence in the PMR)

Fauna: multiple and structured surveys by Crypto Environmental Surveyors (1996) for birds (34), native mammals (2), reptiles (21) and amphibians. Significant bird species: category 1 (1) including Carnaby's Cockatoo, category 3 (2) including Western Thornbill and Splendid Fairy-wren, and category 4 (6). Significant mammal species: Quenda and Western Brush Wallaby. Important site for Western Jewel Butterfly and Sciron Skipper (Williams *et al.* pers. comm.)

Linkage: adjacent bushland to the south (BS385, across road) and west; part of proposed Greenways 13, 14 (Tingay, Alan & Associates 1997a); part of a regionally significant fragmented bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: recommended to be declared as an A-class Nature Reserve for the protection of flora and fauna in Gibson *et al.* 1994; recommended for protection in study of City of Wanneroo bushland (Trudgen 1996); Threatened or Poorly Reserved Plant Community (EPA 1994 GIS); National Trust of Australia (WA) Classification

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed, Indicative Place of the Register of the National Estate

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 Scheduled Fauna, conservation category wetlands; under MRS Parks and Recreation Reservation and Landscape Zoning, Crown Reserve

Constraints: 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.

STAR SWAMP RESERVE AND ADJACENT BUSHLAND, NORTH BEACH/WATERMAN

Boundary Definition: protected area boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 204 **Map no. 44** **Map sheet series ref. no. 2034-II NW**
System 6 (1983): M35 area of bushland goes beyond System area boundaries, all bushland described

Other Names: not known

Area (ha): total 96.8 (includes open water); bushland 94.4

Local Authorities (Suburb)
 City of Stirling (Waterman, North Beach)

Zoning
MRS: Parks and Recreation
TPS: Landscape, Public Use Reserves

Ownership Categories
 State Government, Not identified

Lot/Location/Reserve numbers (Purpose), Street name
 4, 16, 17, 19 Marmion Ave; 709 Hope St; 710, 711, 712 North Beach Rd; 2 Beach Rd
 Crown Reserve

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Spearwood Dunes
 Sands derived from Tamala Limestone (Qts: S7)
 Tamala Limestone (Qtl: LS1)

Wetlands (within the Spearwood Dunes)
 Holocene Swamp Deposits (Qhw: Cps)

VEGETATION AND FLORA

Vegetation Complexes
Spearwood Dunes
 Cottesloe Complex — Central and South
Quindalup Dunes
 Quindalup Complex

Floristic Community Types

- Supergroup 2: Seasonal Wetlands**
- Supergroup 4: Uplands centred on Spearwood and Quindalup Dunes**
 - 24 Northern Spearwood shrublands and woodlands
 - 28 Spearwood *Banksia attenuata* or *B. attenuata* — *Eucalyptus* woodlands

WETLANDS

Wetland Types: sumpland
Natural Wetland Groups
Spearwood Dunes
 Balcatta (S.2)

Wetland Management Objectives: Conservation (3.1ha)
 Swan Coastal Plain Lakes EPP: 3.1ha

THREATENED ECOLOGICAL COMMUNITIES

Not assessed

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: limestone ridge, open water, vegetated wetland, vegetated uplands



Vegetation and Flora: detailed survey (Bell *et al.* 1979; Loneragan *et al.* 1984; Loneragan 1987; Pigott 1994; part Bushplan Site: Watson and Bell 1981); limited survey (part Bushplan Site: DEP 1996 (Star 01-03); EPA and WAWA 1990)

Structural Units: mapping (Bell *et al.* 1979; Loneragan 1987; EPA and WAWA 1990; DEP 1996 (Star 01-03))

Uplands - Sands derived from Tamala Limestone: *Eucalyptus gomphocephala* Tall Open Forest to Open Woodland; *Eucalyptus marginata* and *E. gomphocephala* Open Forest to Woodland (in NW corner); *Banksia attenuata*, *B. menziesii*, *Allocasuarina fraseriana* Low Open Forest to Low Open Woodland

Uplands - Tamala Limestone: *Melaleuca huegelii* and *Dryandra sessilis* var. *cygnorum* Open Heath to Low Open Heath

Wetlands: *Melaleuca raphiophylla* Low Closed Forest

Scattered Native Plants: (canopy only) not assessed (probably <10%)

Vegetation Condition: >50% Very Good to Good, <50% Good to Degraded, with areas of severe localised disturbance

Total Flora: 247 native taxa, 105 weeds (Loneragan 1987, plus P. Pigott and D. Pike pers. comm. and part Bushplan Site records DEP 1996D (Star 01-03)) (estimated >90% expected flora)

Significant Flora: *Jacksonia sericea* (3), *Conostephium minus* (4); *Glischrocaryon aureum*, *Pimelea calcicola*, *Ricinocarpos glaucus*, *Lechenaultia linarioides*, *Astroloma microcalyx*, *Trachymene coerulea*, *Trichocline spathulata*; typical Tamala Limestone taxa — *Grevillea preissii*, *Trymalium ledifolium*, *Melaleuca huegelii*, *Petrophile serruriae* subsp. nov. (GJK 11421), *Pimelea calcicola* (pink)

Fauna: surveyed by RAOU (1996 D), 21 visits, and Loneragan (1987) for birds (66), reptiles (11) and amphibians (4). Good assemblage of small insectivores including Splendid Fairy-wren, White-winged Fairy-wren, Weebill, Broad-tailed, Western and Yellow-rumped thornbills. Significant bird species: category 1 (1), category 3 (9) and category 4 (4). Significant reptile species: Bardick (*Echiopsis curtus*), Carpet Python (*Morelia spilota*). High number of Jewel Beetles (Buprestidae) (Loneragan 1987)

Linkage: adjacent bushland to the south; part of proposed Greenways 4, 7, 39 (Tingay, Alan & Associates 1997a); part of fragmented and potential bushland/wetland linkages (Volume 2A, Map 8)

Other Special Attributes: The National Trust of Australia (WA) Classification; noted as 'a valuable ecological remnant of...the Spearwood Dune Systems...also an important link in a series of wetland Nature Reserves' (Loneragan 1987)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Listed on the Register of the National Estate

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Rarity, 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

Opportunities and/or Constraints

Opportunities: Bushplan Site/part Bushplan Site location of Scheduled Fauna, conservation category wetland; under MRS Parks and Recreation Reservation and TPS Landscape Zoning, Crown Reserve

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.

CARINE SWAMPS, CARINE

Boundary Definition: protected area/bushland/conservation wetland boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 203 **Map no.** 44 **Map sheet series ref. no.** 2034-II NW

System 6 (1983): M37 part System area bushland, only bushland described

Other Names: not known

Area (ha): total 90.5 (includes open water); bushland 33.1

Local Authorities (Suburb)

Zoning

City of Stirling (Carine)

MRS: Parks and Recreation, Controlled Access

Highways

TPS: Landscape

Ownership Categories

Lot/Location/Reserve numbers (Purpose),

Street name

State Government

10, 27 Beach Rd; 11 Duffy Rd

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Spearwood Dunes

Sands derived from Tamala Limestone (Qts: S7)

Tamala Limestone (Qtl: LS1)

Wetlands (within the Spearwood Dunes)

Holocene Swamp Deposits (Qhw: Cps)

VEGETATION AND FLORA

Vegetation Complexes

Spearwood Dunes

Karrakatta Complex — Central and South

Wetlands

Herdsmen Complex

Floristic Community Types: not sampled, types not inferred

Supergroup 2: Seasonal Wetlands

Supergroup 4: Uplands centred on Spearwood and Quindalup Dunes

WETLANDS

Wetland Types: sumpland, river, artificial channel

Natural Wetland Groups

Spearwood Dunes

Balcatta (S.2)

Wetland Management Objectives: Conservation (29.55ha, 235.8m)

Swan Coastal Plain Lakes EPP: 22.4ha + 4.8ha = 27.2ha (total)

THREATENED ECOLOGICAL COMMUNITIES

Not determined

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: open water, vegetated wetlands, vegetated uplands

Vegetation and Flora: limited survey (Dames & Moore 1988a, EPA and WAWA 1990)

Structural Units: mapping (Dames & Moore 1988a, EPA and WAWA 1990)

Uplands - Sands derived from Tamala Limestone: *Eucalyptus gomphocephala* Open Forest

Wetlands: *Melaleuca* sp. Low Closed Forest to Low Woodland; *Baumea* sp. Closed Sedgeland; mixed Closed Sedgeland

Scattered Native Plants: not assessed

Vegetation Condition: >75% Good to Very Good, <25% Degraded, with areas of severe localised disturbance

Total Flora: not known

Significant Flora: none recorded

Fauna: surveyed by RAOU (1996 D), 25 visits, for birds (90) and for amphibians (6) (Dames & Moore 1988a). Good assemblage of ducks including Hardhead, Australasian Shoveler, Blue-billed and Musk Duck, and small insectivores including Splendid Fairy-wren, White-winged Fairy-wren, Weebill, Broad-tailed, Western and Yellow-rumped thornbills. Significant bird species: category 1 (2), category 2 (2), category 3 (12) and category 4 (4). Long-necked Tortoise (*Chelodina longicollis*) (Dames & Moore 1988a)

Linkage: adjacent bushland/canopy to the north; part of proposed Greenways 39, 9 (Tingay, Alan & Associates 1997a); part of a regionally significant potential bushland/wetland linkage (Volume 2A, Map 8)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed; Location for JAMBA/CAMBA species

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Rarity, 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

Opportunities and/or Constraints

Opportunities: Bushplan Site/part Bushplan Site subject to Swan Coastal Plain Lakes EPP; location of Scheduled Fauna, conservation category wetlands; under MRS Parks and Recreation Reservation and TPS Landscape Zoning

Constraints: 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 be enhanced by: amending the purpose of the reserve to include conservation; and applying appropriate mechanisms in consultation with the reserve management body.

LAKE GWELUP RESERVE, GWELUP

Boundary Definition: protected area boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 212 **Map no.** 44, 49 **Map sheet series ref. no.** 2034-II NW, 2034-II NW
System 6 (1983): M39 part System area bushland and part scattered native plants (canopy), all vegetation described

Other Names: not known

Area (ha): total 74.6 (includes open water); bushland 19.9

Local Authorities (Suburb)
 City of Stirling (Gwelup, Karrinyup)

Zoning
MRS: Parks and Recreation, Urban, Urban Deferred
TPS: Landscape

Ownership Categories
 State Government, Private (commercial organisation)

Lot/Location/Reserve numbers (Purpose), Street name
 8694, 9951 Lagonda Dr; 9507 Karrinyup Rd; 9185, 9754 Segrave St; 11, 9201 Wanstead St; 784 Huntriss Rd; 523 Finnerty St; 7, 8 Porter St; 6 Pascoe St; 700 street not identified
 Crown Reserve

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Spearwood Dunes
 Sands derived from Tamala Limestone (Qts: S7)
 Tamala Limestone (Qtl: LS1)
Wetlands (within the Spearwood Dunes)
 Holocene Swamp Deposits (Qhw: Cps)

VEGETATION AND FLORA

Vegetation Complexes
Spearwood Dunes
 Karrakatta Complex — Central and South
 Cottesloe Complex — Central and South
Wetlands
 Herdsman Complex

Floristic Community Types: not sampled, types not inferred
Supergroup 2: Seasonal Wetlands
Supergroup 4: Uplands centred on Spearwood and Quindalup Dunes

WETLANDS

Wetland Types: sumpland, dampland, lake, artificial channel
Natural Wetland Groups
Spearwood Dunes
 Balcatta (S.2)
Wetland Management Objectives: Conservation (37.9ha), Resource Enhancement
Swan Coastal Plain Lakes EPP: 30.8ha

THREATENED ECOLOGICAL COMMUNITIES

Not determined

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: open water, vegetated wetland, vegetated uplands
Vegetation and Flora: detailed survey (Halpern Glick Maunsell 1992); limited survey (EPA and WAWA 1990)
Structural Units: mapping (EPA and WAWA 1990; Halpern Glick Maunsell 1992)
 Uplands - Sands derived from Tamala Limestone: *Eucalyptus gomphocephala* Low Woodland to Open Forest; *Eucalyptus calophylla* Open Woodland; *Eucalyptus gomphocephala* and *E. calophylla* Open Woodland; *Acacia saligna* Tall Open Shrubland to Open Tall Scrub
 Wetlands: *Eucalyptus rudis* Woodland to Open Forest, associated with *Eucalyptus calophylla* and *Acacia saligna*; *Melaleuca raphiophylla* Low Woodland
Scattered Native Plants: *Eucalyptus calophylla*, *E. rudis* and *Melaleuca raphiophylla* Low Open Woodland; *Eucalyptus gomphocephala* and *E. calophylla* Open Woodland
Vegetation Condition: >20% Excellent to Very Good, <45% Good to Degraded, >35% Completely Degraded, with areas of severe localised disturbance (Halpern Glick Maunsell 1992)
Total Flora: 77 native taxa (Halpern Glick Maunsell 1992) (>50% expected flora)



Significant Flora: none recorded

Fauna: surveyed by RAOU (1996 D), 16 visits, and others for birds (111). Good assemblage of ducks including Hardhead, Australasian Shoveler, Blue-billed, Pink-eared and Musk Duck. Significant bird species: category 1 (1), category 3 (12) and category 4 (6)

Linkage: adjacent bushland to the north; part of proposed Greenways 9, 8 (Tingay, Alan & Associates 1997a); part of a regionally significant potential bushland/wetland linkage (Volume 2A, Map 8)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Rarity, 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

Opportunities and/or Constraints

Opportunities: Bushplan Site/part Bushplan Site subject to Swan Coastal Plain Lakes EPP; location of Scheduled Fauna, conservation category wetlands; under MRS Parks and Recreation Reservation and TPS Landscape Zoning, Crown Reserve

Constraints: private land; under MRS Urban Zoning and Urban Deferred Zoning, 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.

REID HIGHWAY BUSHLAND, MIRRABOOKA/MALAGA

Boundary Definition: protected area boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 385 **Map no.** 45, 46 **Map sheet series ref. no.** 2034-II NE, 2034-II NW

Other Names: not known

Area (ha): total 130.5; bushland 96.1

Local Authorities (Suburb)

Zoning

City of Stirling (Mirrabooka, Malaga), Shire of Swan (Malaga)

MRS: Urban, Controlled Access Highways, Parks and Recreation, Important Regional Roads

TPS: Landscape, Private Institutions

Ownership Categories

Lot/Location/Reserve numbers (Purpose),

State Government, Local Government, Not identified

Street name

0, 1, 41, 48, 90, 112, 302, 499, 4779, 9251, 11591
Alexander Dr; 1, 13, 16, 17, 60, 303, 1000 Camboon Rd; 7553 Truganina Rd; 1, 4, 5, 12, 13, 91 Agett Rd; 3, 4, 5, 194, 195, 196, 197, 198, 199, 214, 239, 240, 245, 246, 247, 248, 249, 250, 251, 252, 4773 Victoria Rd; 0 Boyare Ave; 3, 200, 243, 244, 4775, 8904 Northwood Dr; 253, 8902 Mirrabooka Ave; 207, 208, 209, 210, 211, 212, 213, 241, 242, 985 Australis Ave; 197, 205, 206, Rheingold Pl; 0, 1, 34, 35 Reid Hwy; 498 Woodbine Tce; 0 street not identified

Crown Reserve

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Bassendean Dunes

Bassendean Sands (Qpb: S8)

Bassendean Dunes/Pinjarra Plain

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

Spearwood Dunes

Sands derived from Tamala Limestone (Qts: S7)

Wetlands (within the Spearwood Dunes)

Holocene Swamp Deposits (Qhw: Cps)



VEGETATION AND FLORA

Vegetation Complexes

Bassendean Dunes

Bassendean Complex — Central and South

Spearwood Dunes

Karrakatta Complex — Central and South

Floristic Community Types: not sampled, types not inferred

Supergroup 2: Seasonal Wetlands

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau AND/OR

Supergroup 4: Uplands centred on Spearwood and Quindalup Dunes

WETLANDS

Wetland Types: sumpland, dampland

Natural Wetland Groups

Bassendean Dunes

Jandakot (B.3)

Wetland Management Objectives: Resource Enhancement

Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Not determined

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated wetland, vegetated uplands

Vegetation and Flora: limited survey (part Bushplan Site — DEP 1996)

Structural Units

Uplands: Low Woodland dominated by *Banksia attenuata* and *B. menziesii* with scattered *Eucalyptus todtiana*

Wetlands: not known

Scattered Native Plants: not assessed

Vegetation Condition: Very Good (Connell 1995)

Total Flora: not known

Significant Flora: *Gyrostemon ramulosus* (uncommon in the PMR)

Fauna: no known information

Linkage: adjacent bushland to the north (BS201, across road) and south (across road); part of proposed Greenways 14, 39 (Tingay, Alan & Associates 1997a); part of fragmented and potential bushland/wetland linkages (Volume 2A, Map 8)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Criteria not relevant to determination of conservation value, but which may be applied when evaluating areas having similar values

Opportunities and/or Constraints

Opportunities: Bushplan Site/part Bushplan Site subject to Swan and Canning Rivers EPP; under MRS Parks and Recreation Reservation and TPS Landscape Zoning, Crown Reserve

Constraints: under MRS Urban Zoning, MRD regional road requirements

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s). This may include — 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.

COTTONWOOD CRESCENT, DIANELLA

Boundary Definition: bushland (part taken to cadastre) boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 43

Map no. 50

Map sheet series ref. no. 2034-II SW

Other Names: not known

Area (ha): total 12.1; bushland 11.3

Local Authorities (Suburb)

Zoning

City of Stirling (Dianella)

MRS: Urban, Parks and Recreation, Public Purposes-High School

TPS: Landscape, Special Use

Ownership Categories
State Government, Private (commercial organisation)

**Lot/Location/Reserve numbers (Purpose),
Street name**
50, 10471, 10770 Cottonwood Cr; 9 Osborne Rd; 10977
Dianella Dr
Crown Reserve

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Spearwood Dunes
Sands derived from Tamala Limestone (Qts: S7)

VEGETATION AND FLORA

Vegetation Complexes
Spearwood Dunes
Karrakatta Complex — Central and South

Floristic Community Types

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau
23a Central *Banksia attenuata* — *B. menziesii* woodlands

WETLANDS

No wetlands mapped

THREATENED ECOLOGICAL COMMUNITIES

Not assessed

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated uplands

Vegetation and Flora: limited survey (DEP 1996 (Tele 01))

Structural Units

Uplands: *Banksia menziesii* and *B. attenuata* Low Open Woodland to Woodland with scattered *Banksia ilicifolia*, *Allocasuarina fraseriana* and *Nuytsia floribunda*; *Allocasuarina humilis*, *Jacksonia densiflora* and *Eremaea pauciflora* Open Heath

Vegetation Condition: >75% Very Good to Excellent, <25% Good to Degraded, with areas of severe localised disturbance

Total Flora: 73 native taxa, 7 weeds (plot-generated list only and adjacent records, estimated >50% expected flora)

Significant Flora: *Cyathochaeta clandestina* (most western population in the PMR)

Fauna: multiple and structured surveys by Western Australian Museum of Natural Science (How *et al.* 1996) for birds (27), native mammals (1), reptiles (15) and amphibians (2) (How *et al.* 1996). Significant bird species: category 1 (1) and category 4 (1). Significant mammal species: Western Grey Kangaroo. Significant reptile species: a skink (*Morethia lineoocellata*)

Linkage: adjacent bushland to the south

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Rarity, Diversity, Criteria not relevant to determination of conservation value, but which may be applied when evaluating areas having similar values

Opportunities and/or Constraints

Opportunities: Bushplan Site/part Bushplan Site subject to Swan and Canning Rivers EPP; location of Scheduled Fauna; under MRS Parks and Recreation Reservation and TPS Landscape Zoning, Planning Control Area No. 30, Crown Reserve

Constraints: private land; under MRS Urban Zoning

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s).

HERDSMAN LAKE

Boundary Definition: protected area/conservation wetland boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 281 **Map no.** 49, 50 **Map sheet series ref. no.** 2034-II SW
System 6 (1983): M43 part System area bushland, only bushland described



Other Names: not known

Local Authorities (Suburb)

City of Stirling (Herdsman, Churchlands, Glendalough)

Ownership Categories

Private (commercial organisation), Local Government, State Government, Not identified

Area (ha): total 311.3 (includes open water); bushland 22.6

Zoning

MRS: Parks and Recreation

TPS: Landscape

Lot/Location/Reserve numbers (Purpose),

Street name

1, 2, 3, 83, 84, 85, 86, 113, 115, 116, 117, 118, 119, 137, 138, 139, 452, 501 Lakeside Rd; 3, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405 421, 470, Selby St; 1, 29, 41, 82, 303, 460, 1003, 1005, 1007 Pearson St; 1, 2, 3, 12, 109, 304, 461, 468, 475, 477, 483, 484 Jon Sanders Dv; 0, 1, 2, 3, 4, 9, 12, 15, 50, 200, 430, 458, 462, 463, 493, 496, 604, 605, 607 Moondine Dr; 13, 8059 Herdsman Pde; 352 Bishop Riley Wy; 54, 393, 450, 480, 484, 1005 street not identified

Crown Reserve

Reserve 31906 (Environmental Education and Conservation of Flora and Fauna)

CALM Managed Land

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Spearwood Dunes

Sands derived from Tamala Limestone (Qts: S7)

Wetlands (within the Spearwood Dunes)

Holocene Swamp Deposits (Qhw: Cps)

VEGETATION AND FLORA

Vegetation Complexes

Wetlands

Herdsman Complex

Floristic Community Types: not sampled, insufficient vegetation

WETLANDS

Wetland Types: lake, artificial channel

Natural Wetland Groups

Spearwood Dunes

Balcatta (S.2)

Wetland Management Objectives: Conservation (307.5ha)

Swan Coastal Plain Lakes EPP: 252.3ha

THREATENED ECOLOGICAL COMMUNITIES

Not determined

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: open water, vegetated wetland

Vegetation and Flora

Structural Units: mapping (EPA and WAWA 1990)

Wetlands: *Eucalyptus rudis* Woodland; *Melaleuca* sp. Low Woodland; *Melaleuca raphiophylla* Low Open Forest, *Baumea articulata* Sedgeland

Scattered Native Plants: *Eucalyptus rudis* Woodland and *Melaleuca* sp. Low Woodland - regionally significant vegetation recognised as being included in the area of Bushplan Site in need of protection

Vegetation Condition: <10% Good, >90% Degraded to Completely Degraded

Total Flora: not known

Significant Flora: none recorded

Fauna: surveyed by RAOU (1996 D), 51 visits, for birds (107), limited survey for reptiles (7) (J. Dell pers. comm.). Good assemblage of ducks and other waterfowl including Hardhead, Australasian Shoveler, Blue-billed, Pink-eared and Musk ducks and Dusky Moorhen. Important feeding site for birds of prey, including Swamp Harrier, and aerial insectivores, including Tree Martin and Welcome Swallow (J. Dell pers. comm.). Significant bird species: category 1 (2), category 2 (6), category 3 (9), and category 4 (4). Significant reptile species: Mourning Skink (*Egernia luctuosa*). Important research and teaching site

Linkage: no adjacent bushland; part of proposed Greenways 19, 23 (Tingay, Alan & Associates 1997a); part of a regionally significant potential bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: to become the Herdsman Lake Regional Park (State Government Cabinet Minute 5 May 1997)



SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

ANCA Directory of Important Wetlands in Australia; Listed on the Register of the National Estate; Location for JAMBA/CAMBA species

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Rarity, 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

Opportunities and/or Constraints

Opportunities: Bushplan Site/part Bushplan Site subject to Swan Coastal Plain Lakes EPP; location of Scheduled Fauna, conservation category wetland; under MRS Parks and Recreation Reservation and TPS Landscape Zoning, Crown Reserve

Constraints: private land

Recommendation: The care, control and management of this area for conservation purposes within Herdsman Lake Regional Park is endorsed.

BOLD PARK AND ADJACENT BUSHLAND, CITY BEACH

Boundary Definition: protected area/management/bushland boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 312 **Map no.** 49, 55 **Map sheet series ref. no.** 2034-II SW

System 6 (1983): M47 part System area bushland and part scattered native plants (canopy), all vegetation described

Other Names: not known

Area (ha): total 511.1 (includes open water); bushland 362.1

Local Authorities (Suburb)

Town of Cambridge (City Beach, Floreat), City of Nedlands (Mt Claremont)

Zoning

MRS: Parks and Recreation, Urban, Important Regional Roads, Public Purposes-High School

TPS: Development, Landscape, Special Use

Ownership Categories

Local Government, State Government, Private (commercial organisation)

Lot/Location/Reserve numbers (Purpose),

Street name

0, 1 Brockway Rd; 0 The Boulevard; 1, 8424 Kalinda Dr; 1 Elphin St; 1911 Stephenson Ave; 1 Yaringa Way; 1 Alderbury St; 1911 street not identified
Crown Reserve

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Spearwood Dunes

Sands derived from Tamala Limestone (Qts: S7)

Tamala Limestone (Qtl: LS1)

Quindalup Dunes (Holocene dunes)

Safety Bay Sands (Qhs: S2)

Wetlands (within the Quindalup/Spearwood Dunes)

Holocene Swamp Deposits (Qhw: Cps)

VEGETATION AND FLORA

Vegetation Complexes

Spearwood Dunes (near the interface with the Quindalup Complex)

Karrakatta Complex — Central and South

Cottesloe Complex — Central and South

Floristic Community Types

Supergroup 2: Seasonal Wetlands

S7 Northern woodlands to forests over tall sedgeland alongside permanent wetlands

Supergroup 4: Uplands centred on Spearwood and Quindalup Dunes

24 Northern Spearwood shrublands and woodlands

25 Southern *Eucalyptus gomphocephala* — *Agonis flexuosa* woodlands

27 Species poor mallees and shrublands on limestone

29b *Acacia* shrublands on taller dunes

30a2 Woodlands and shrublands on Holocene dunes

S11 Northern *Acacia rostellifera* — *Melaleuca acerosa* shrublands



WETLANDS**Wetland Types:** lake, sumpland**Natural Wetland Groups****Spearwood Dunes**

Balcatta (S.2)

Wetland Management Objectives: Conservation (12ha)**Swan Coastal Plain Lakes EPP:** 18.2ha**THREATENED ECOLOGICAL COMMUNITIES**

Not assessed, Not determined

SECTION 3: SPECIFIC SITE DETAIL**Landscape Features:** coastal dunes, inland dunes, limestone ridge, open water, vegetated wetlands**Vegetation and Flora:** detailed survey (part Bushplan Site – Keighery, GJ, *et al.* 1990, Keighery, GJ, and Keighery 1993c, Kinhill Engineers Pty Ltd 1987, Mitchell McCotter and Ecoscape 1993); limited survey (part Bushplan Site — Dames and Moore 1986, Griffin 1993, 1994 (plots SW 01–11), Gibson *et al.* 1994 (plots Bold 01–04), Keighery, GJ, 1996 D (plots M46 01–02))**Structural Units:** mapping (Keighery, GJ, *et al.* 1990, Mitchell McCotter and Ecoscape 1993, Kinhill Engineers Pty Ltd 1987)**Spearwood Dunes**Uplands - Sands derived from Tamala Limestone: *Eucalyptus gomphocephala* Open Forest to Woodland; *Banksia attenuata* and *B. menziesii* Low Woodland; *Eucalyptus decipiens* Low Woodland; *Eucalyptus gomphocephala* and *E. marginata* Woodland; *Eucalyptus marginata* and *E. calophylla* Woodland; Closed Low Heaths and Closed to Open Heaths dominated by *Acacia truncata*, *Melaleuca acerosa*, *Calothamnus quadrifidus*, *Allocasuarina humilis* and combinations of theseUplands - Tamala Limestone: Closed Low Heaths, Closed to Open Heaths and Tall Scrub dominated by *Acacia truncata*, *Melaleuca acerosa*, *Calothamnus quadrifidus*, *Dryandra sessilis* var. *cygnorum*, *Grevillea crithmifolia*, *Acacia lasiocarpa*; *A. xanthina* and combinations of these; *Eucalyptus foecunda* Closed Shrub MalleeWetlands: *Eucalyptus rudis* Woodland; *Bolboschoenus caldwellii* Sedgeland; Mixed Herblands (on dry lake bed)**Quindalup Dunes**Uplands - Safety Bay Sands: Oldest dunes - Open Heaths dominated by *Melaleuca acerosa*, *Acacia rostellifera*, *Chamelaucium uncinatum*, *Calothamnus quadrifidus*, *Olearia axillaris*, *Acacia xanthina* and combinations of these over Herblands dominated by *Lomandra* sp.; *Agonis flexuosa* Low Closed Forest**Scattered Native Plants:** *Eucalyptus gomphocephala* Woodland; *Eucalyptus marginata* and *E. calophylla* Woodland — regionally significant vegetation recognised as being included in the area of Bushplan Site in need of protection**Vegetation Condition:** >60% Very Good to Excellent, <40% Good to Degraded**Total Flora:** 268 native taxa, 134 weeds (compilation by Gibson *et al.* 1994D, Keighery, GJ, *et al.* 1990, Keighery, GJ, and Keighery 1993c, Mitchell McCotter and Ecoscape 1993) (estimated 90% expected flora)**Significant Flora:** *Beyeria cygnorum* (2), *Jacksonia sericea* (3), *Hibbertia spicata* subsp. *leptothea* (3), *Stylidium maritimum* (3); Keighery, GJ, *et al.* 1990 — most southern populations of *Chamelaucium uncinatum*, *Melaleuca cardiophylla*, *Allocasuarina lehmanniana*, *Gyrostemon ramulosus* (uncommon on the Plain, poorly reserved), most northern population of *Agonis flexuosa*; *Fimbristylis vittata* (uncommon on the Plain, a species of the dry lake bed community), typical of Tamala Limestone taxa: *Astroloma microcalyx*, *Grevillea crithmifolia*, *Grevillea preissii*, *Beyeria cygnorum*, *Melaleuca cardiophylla*, *Trymalium ledifolium* subsp. *ledifolium*, *Diplopeltis huegelii* var. *huegelii*, *Stylidium junceum* (limestone variant), *Pimelea calcicola***Fauna:** multiple and structured surveys by Western Australian Museum of Natural Science for birds (106), native mammals (1), reptiles (33) and amphibians (3) (How and Dell 1990, How *et al.* 1996). Significant populations of Blue-billed Duck, Musk Duck, Hardhead, Splendid and Variegated Fairy-wrens and a large assemblage of honeyeaters. Significant bird species: category 1 (1), category 2 (6), category 3 (13) and category 4 (8). Many burrowing and fossorial reptiles including five species of snakes of the genus *Simoselaps***Linkage:** adjacent bushland to the south (BS315, part across road); part of proposed Greenways 19, 20 (Tingay, Alan & Associates 1997a); part of a regionally significant fragmented bushland/wetland linkage (Volume 2A, Map 8)**Other Special Attributes:** Quindalup/Spearwood Dune System interface, significant fauna habitat, rich in reptiles and birds; National Trust of Australia (WA) Classification**SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE**

Not listed; Indicative Place of the Register of the National Estate; Location for JAMBA/CAMBA species

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS**Criteria:** Representation of ecological communities, Diversity, Rarity, Maintaining ecological processes or natural systems, 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

Opportunities and/or Constraints

Opportunities: Bushplan Site/part Bushplan Site subject to Swan Coastal Plain Lakes EPP; location of Scheduled Fauna, conservation category wetland; under MRS Parks and Recreation Reservation and TPS Landscape Zoning, Crown Reserve

Constraints: private land; under MRS Urban Zoning, MRD regional road requirements

Recommendation: The existing purpose, care, control and management of this Bushplan Site is endorsed.

UNDERWOOD AVENUE BUSHLAND, SHENTON PARK

Boundary Definition: bushland (part taken to cadastre) boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 119 **Map no.** 55 **Map sheet series ref. no.** 2034-II SW

Other Names: not known

Area (ha): total: 32.1; bushland 31.5

Local Authorities (Suburb)

Zoning

City of Nedlands (Shenton Park)

MRS: Urban, Important Regional Roads

TPS: Development

Ownership Categories

Lot/Location/Reserve numbers (Purpose),

State Government

Street name

0, 4 Underwood Ave

Crown Reserve

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Spearwood Dunes

Sands derived from Tamala Limestone (Qts: S7)

VEGETATION AND FLORA

Vegetation Complexes

Spearwood Dunes

Karrakatta Complex — Central and South

Floristic Community Types: *not sampled, types inferred

Supergroup 4: Uplands centred on Spearwood and Quindalup Dunes

*28 Spearwood *Banksia attenuata* or *B. attenuata* — *Eucalyptus* woodlands

WETLANDS

No wetlands mapped

THREATENED ECOLOGICAL COMMUNITIES

Not assessed

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: tall dune, vegetated uplands

Vegetation and Flora: limited survey (DEP 1996, surveyed from roadside)

Structural Units

Uplands: Woodland dominated by *Eucalyptus marginata* or *E. gomphocephala* over *Banksia attenuata*, *B. menziesii* and *Allocasuarina fraseriana* Low Woodland; *Banksia attenuata*, *B. menziesii* and *Allocasuarina fraseriana* Low Woodland generally with scattered emergent *Eucalyptus marginata* or *E. gomphocephala* and sometimes with scattered emergent *Eucalyptus calophylla*

Vegetation Condition: >50% Very Good, <50% Good to Degraded, with areas of severe localised disturbance

Significant Flora: not surveyed

Fauna: limited survey by J. Dell (pers. comm.) for birds (12) and reptiles (3)

Linkage: adjacent bushland/canopy to the south; part of proposed Greenway 20 (Tingay, Alan & Associates 1997a); part of a regionally significant potential bushland/wetland linkage (Volume 2A, Map 8)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities

Opportunities and/or Constraints

Opportunities: Bushplan Site/part Bushplan subject to Swan and Canning Rivers EPP; under Crown Reserve

Constraints: under MRS Urban Zoning, MRD regional road requirements

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s).



SHENTON BUSHLAND, SHENTON PARK

Boundary Definition: protected area boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 218 **Map no.** 55 **Map sheet series ref. no.** 2034-II SW

Other Names: not known

Area (ha): total 20.9; bushland 19.7

Local Authorities (Suburb)

Zoning

City of Nedlands (Karrakatta)

MRS: Urban, Public Purposes-Hospital, Public Purposes-Commonwealth Government

TPS: Landscape, Light Industry

Ownership Categories

Lot/Location/Reserve numbers (Purpose),

Local Government

Street name

12019 Lemnos St

Crown Reserve

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Spearwood Dunes

Sands derived from Tamala Limestone (Qts: S7)

VEGETATION AND FLORA

Vegetation Complexes

Spearwood Dunes

Karrakatta Complex — Central and South

Floristic Community Types

Supergroup 4: Uplands centred on Spearwood and Quindalup Dunes

28 Spearwood *Banksia attenuata* or *B. attenuata* — *Eucalyptus* woodlands

WETLANDS

No wetlands mapped

THREATENED ECOLOGICAL COMMUNITIES

Not assessed

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated uplands

Vegetation and Flora: detailed survey (Ecoscape 1994a), limited survey (Gibson *et al.* 1994 (Shent 01))

Structural Units

Uplands: *Eucalyptus marginata* Woodland over *Banksia attenuata*, *B. menziesii* and *Allocasuarina fraseriana* Low Woodland; *Banksia attenuata*, *B. menziesii* and *Allocasuarina fraseriana* Low Woodland with scattered emergent *Eucalyptus marginata* and with occasional emergent *E. gomphocephala*

Scattered Native Plants: from above communities - regionally significant vegetation recognised as being included in the area of Bushplan Site in need of protection

Vegetation Condition: >50% Very Good to Excellent, <50% Good to Degraded, with areas of severe localised disturbance

Total Flora: 109 native taxa, 40 weeds (estimated >90% expected flora, Wildflower Society and CALM in Ecoscape 1994a)

Significant Flora: *Jacksonia sericea* (3)

Fauna: multiple and structured surveys for birds (32) and reptiles (17) and amphibians (3) (O. Berry and P. Berry, pers comm.). Significant bird species: category 1 (1), category 3 (3) and category 4 (3). Rich reptile assemblage for the size of reserve. Significant reptile species: Gould's Varanus (*Varanus gouldii*)

Linkage: adjacent bushland/canopy to the north, south, east and west; part of a regionally significant potential bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: National Trust of Australia (WA) Classification

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Rarity, Maintaining ecological processes or natural systems, Criteria not relevant to determination of conservation value, but which may be applied when evaluating areas having similar values

Opportunities and/or Constraints

Opportunities: Bushplan Site/part Bushplan Site location of Scheduled Fauna; under TPS Landscape Zoning, Crown Reserve



Constraints: under MRS Urban Zoning

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.

KINGS PARK

Boundary Definition: protected area boundary (Areas of bushland within the boundaries of the Bushplan Site are not accurately mapped.)

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 317 Map no. 56 Map sheet series ref. no. 2034-II SW
System 6 (1983): M49 part System area bushland and part scattered native plants (canopy), all vegetation described

Other Names: not known

Area (ha): total 406.3; bushland 320.8 (267 — Anon. 1993)

Local Authorities (Suburb)
City of Perth (West Perth)

Zoning
MRS: Parks and Recreation
TPS: Landscape

Ownership Categories
Private (including commercial organisation), Local Government, Not identified

Lot/Location/Reserve numbers (Purpose), Street name
0, 3, 59, 61, 62 Mounts Bay Rd; 1, 2, 4, 5 Bellevue Tce; 50 Mount St; 7 Cliff St
Crown Reserve

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Pinjarra Plain
Guildford Formation (Qha: S14) (not naturally vegetated)
Spearwood Dunes
Sands derived from Tamala Limestone (Qts: S7)
Tamala Limestone (Qtl: LS1)

VEGETATION AND FLORA

Vegetation Complexes
Spearwood Dunes
Karrakatta Complex — Central and South
Marine (lagoonal and estuarine) Deposits
Vasse Complex (not vegetated)

Floristic Community Types: *not sampled, type inferred
Supergroup 4: Uplands centred on Spearwood and Quindalup Dunes
*27 Species poor mallees and shrublands on limestone (scarp)
28 Spearwood *Banksia attenuata* or *B. attenuata* — *Eucalyptus* woodlands

WETLANDS

Wetland Types: artificial lake
Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Not assessed

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: river — limestone cliff, vegetated uplands
Vegetation and Flora: detailed survey (part Bushplan Site — Baird 1977; Bennett 1988, 1995); limited survey (Anon. 1993; Beard 1967; Kings Park and Botanic Garden 1995; part Bushplan Site — Gibson *et al.* 1994 (King 01-02); Main and Serventy 1957; Matiske 1987)

Structural Units: mapping (Anon. 1993; Bennett 1988; Matiske 1987)
Uplands - Sands derived from Tamala Limestone: *Eucalyptus marginata* Open Forest to Woodland with *Banksia menziesii* and *Xanthorrhoea preissii*; *Eucalyptus gomphocephala*, *E. marginata*, *E. calophylla* Woodland with *Banksia grandis* and *Hibbertia hypericoides*; *Eucalyptus marginata*, *Banksia ilicifolia* Open Forest to Woodland with *Xanthorrhoea preissii*, *Mesomelaena pseudostygia*; *Eucalyptus gomphocephala* Open Woodland; all of these structural units have eucalypts with *Allocasuarina fraseriana*, *Banksia attenuata* and at least one other *Banksia* species.



Uplands - Tamala Limestone: *Melaleuca huegelii* Mixed Closed Heath with *Grevillea preissii* and *Templetonia retusa*

Scattered Native Plants: *Eucalyptus gomphocephala*, *E. calophylla*, *E. marginata* Open Forest to Woodland; 10% to 20% of Park

Vegetation Condition: >15% Excellent, <85% Very Good to Good, with small areas of severe localised disturbance

Total Flora: 293 native taxa, 172 weeds (estimated >95% expected flora) (Bennett 1995)

Significant Flora: *Acacia benthamii* (2), *A. alata*, *Lasiopetalum membranaceum* (2), *Jacksonia sericea* (3), *Dodonaea hackettiana* (4); *Callitris preissii*, *Conospermum triplinervium*, *Gnephosis angianthoides* (= *Calocephalus angianthoides*, not recently recorded, probably associated with sandy flats beside the river, see BS368), *Trachymene coerulea*, *Astroloma macrocalyx*, *Ricinocarpos glaucus*, *Lechenaultia linarioides*, *Grevillea preissii*, *Trymalium ledifolium* subsp. *ledifolium*, *Glischrocaryon aureum*; rare or uncommon on coastal plain in PMR — *Pterostylis picta* (only occurrence in PMR), *Caladenia attingens* subsp. *attingens*, *Amyema miquelii*, *Cartonema philydroides* and the fern *Anogramma leptophylla*; typical Tamala Limestone taxa — *Melaleuca huegelii*, *Grevillea preissii*, *Trymalium ledifolium* subsp. *ledifolium*, *Caladenia longicauda* subsp. *calcigena* ms, *Petrophile serruriae* subsp. nov. (GJK 11421)

Fauna: multiple and structured surveys by Western Australian Museum of Natural Science (unpublished) and others (eg. Recher and Serventy 1991) for birds (61) and by Western Australian Museum of Natural Science (How *et al.* 1993) for native mammals (1), reptiles (25) (How and Dell 1994), and amphibians (4). Significant birds: Carnaby's Cockatoo, Weebill, Broad-tailed, Western and Yellow-rumped thornbills and Australian Sittella. Good assemblage of nectar feeders. Significant bird species: category 1 (1), category 3 (8) and category 4 (8). Significant reptile species: a skink (*Cyclodomorphus celatus*). Important research and teaching site for assessment of faunal changes

Linkage: no adjacent bushland; part of proposed Greenways 20, 24 (Tingay, Alan & Associates 1997a); part of a regionally significant potential bushland/wetland linkage (Volume 2A, Map 8)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Rarity, 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

Opportunities and/or Constraints

Opportunities: Bushplan Site/part Bushplan Site subject to Swan and Canning Rivers EPP; location of Scheduled Fauna; under MRS Parks and Recreation Reservation and TPS Landscape Zoning, Crown Reserve

Constraints: private land

Recommendation: The existing purpose, care, control and management of this Bushplan Site is endorsed.

LAKE CLAREMONT, CLAREMONT/SWANBOURNE

Boundary Definition: protected area boundary (native vegetation after EPA and WAWA 1990; Lantzke *et al.* 1989)

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 220 **Map no.** 55 **Map sheet series ref. no.** 2034-II SW

System 6 (1983): M48 part System area bushland and part scattered native plants (canopy), all vegetation described

Other Names

Butlers Swamp

Local Authorities (Suburb)

Town of Claremont (Claremont, Swanbourne)

Ownership Categories

Local Government, State Government, Private (commercial organisation)

Area (ha): total 56.7 (includes open water); bushland 0 (note comment under Boundary Definition)

Zoning

MRS: Parks and Recreation

TPS: Landscape

Lot/Location/Reserve numbers (Purpose),

Street name

150 Gloucester St; 1, 2 Narla Rd; 101, 151 Fern St; 58, 60 Strickland St; 1, 5, 6, 7, 6223 Stirling Rd; 0, 50, 1366, 7813 Davies Rd; 8 Alfred Rd; 1063 Devon Rd; 51, 2563 Lakeway St

Crown Reserve

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Spearwood Dunes

Sands derived from Tamala Limestone (Qts: S7)



Tamala Limestone (Qtl: LS1)
Quindalup Dunes (Holocene Dunes)
 Safety Bay Sands (Qhs: S2)
Wetlands (within the Spearwood Dunes)
 Holocene Swamp Deposits (Qhw: Cps)

VEGETATION AND FLORA

Vegetation Complexes

Spearwood Dunes

Karrakatta Complex — Central and South

Floristic Community Types: not sampled, insufficient vegetation

WETLANDS

Wetland Types: sumpland

Natural Wetland Groups

Spearwood Dunes

Balcatta (S.2)

Wetland Management Objectives: Conservation (16.3ha)

Swan Coastal Plain Lakes EPP: 15.8ha

THREATENED ECOLOGICAL COMMUNITIES

Not determined

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: open water, vegetated wetland

Vegetation and Flora: limited survey (EPA and WAWA 1990)

Structural Units: mapping (EPA and WAWA 1990; Lantzke *et al.* 1989)

Wetlands: *Melaleuca raphiophylla* Low Closed Forest

Scattered Native Plants: *Eucalyptus gomphocephala* Open Woodland to Open Forest; *Eucalyptus gomphocephala* and *Agonis flexuosa* Open Woodland - regionally significant vegetation recognised as being included in the area of Bushplan Site in need of protection

Vegetation Condition: 25% Good, <75% Degraded to Completely Degraded (Lantzke *et al.* 1989)

Total Flora: not known

Significant Flora: none recorded

Fauna: surveyed by RAOU (1996 D), 6 visits, and Lantzke *et al.* (1989) for birds (57). Good assemblage of ducks including Hairyhead, Australasian Shoveler, Blue-billed, Pink-eared and Musk ducks and several JAMBA/CAMBA species. Significant bird species: category 1 (1), category 2 (4) category 3 (6) and category 4 (2)

Linkage: adjacent bushland to the north

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed; Location for JAMBA/CAMBA species

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Rarity, 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

Opportunities and/or Constraints

Opportunities: Bushplan Site/part Bushplan Site subject to Swan Coastal Plain Lakes EPP; location of Scheduled Fauna, conservation category wetlands; under MRS Parks and Recreation Reservation and TPS Landscape Zoning, Crown Reserve

Constraints: private land

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.

HARRY SANDON PARK, ATTADALE

Boundary Definition: bushland (part taken to cadastre and zoning) boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 226 Map no. 60 Map sheet series ref. no. 2033-I NW
System 6 (1983): M63 area of bushland goes beyond System area boundaries, all bushland described



Other names: not known
Local Authorities (Suburb)
 City of Melville (Attadale)

Ownership Categories
 Local Government

Area (ha): total 4.4; bushland 4.2
Zoning
MRS: Urban
TPS: Landscape, Local Open Space
Lot/Location/Reserve numbers (Purpose),
Street name
 2, 8550 Haig Rd
 Crown Reserve

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Pinjarra Plain

Guildford Formation (Qha: Sm1)

Spearwood Dunes

Sands derived from Tamala Limestone (Qts: S7)

VEGETATION AND FLORA

Vegetation Complexes

Spearwood Dunes

Karrakatta Complex — Central and South

Floristic Community Types

Supergroup 4: Uplands centred on Spearwood and Quindalup Dunes

28 Spearwood *Banksia attenuata* or *B. attenuata* — *Eucalyptus* woodlands

WETLANDS

No wetlands mapped

THREATENED ECOLOGICAL COMMUNITIES

Not assessed

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated uplands

Vegetation and Flora: limited survey (DEP 1996 (Sand 01))

Structural Units

Uplands: *Banksia menziesii* and *B. attenuata* Low Open Forest with scattered *Eucalyptus calophylla*

Vegetation Condition: >75% Excellent to Very Good, <25% Good to Degraded, with areas of severe localised disturbance

Total Flora: 58 native taxa (plot-generated list only) (estimated <50% expected flora)

Significant Flora: *Conospermum triplinervium*

Fauna: limited survey for birds (15) (S. Cavicchiolo pers. comm.). Significant bird species: category 1 (1) and category 4 (1)

Linkage: no adjacent bushland

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Rarity, Criteria not relevant to determination of conservation value, but which may be applied when evaluating areas having similar values

Opportunities and/or Constraints

Constraints: Bushplan Site/part Bushplan Site subject to Swan and Canning Rivers EPP; location of Scheduled Fauna; under TPS Landscape Zoning and Local Open Space Zoning, Crown Reserve

Opportunities: under MRS Urban Zoning

Recommendation: The existing purpose, care, control and management of this reserve is endorsed.

WIRELESS HILL PARK, ARDROSS

Boundary Definition: protected area boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 336 **Map no.** 61 **Map sheet series ref. no.** 2033-I NW

System 6 (1983): M64 Part System area bushland, only bushland described



Other Names: not known
Local Authorities (Suburb)
 City of Melville (Ardross, Alfred Cove)

Area (ha): total 40.6; bushland 35.2
Zoning
MRS: Parks and Recreation, Urban, Other Major Highways
TPS: Landscape
Lot/Location/Reserve numbers (Purpose), Street name
 0, 223, 8404 Canning Hwy; 8534 Almondbury Rd
 Crown Reserve

Ownership Categories
 Local Government, State Government

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Spearwood Dunes
 Sands derived from Tamala Limestone (Qts: S7)

VEGETATION AND FLORA

Vegetation Complexes
Bassendean Dunes
 Bassendean Complex — Central and South
Spearwood Dunes
 Karrakatta Complex — Central and South

Floristic Community Types

Supergroup 4: Uplands centred on Spearwood and Quindalup Dunes
 28 Spearwood *Banksia attenuata* or *B. attenuata* — *Eucalyptus* woodlands

WETLANDS

No wetlands mapped

THREATENED ECOLOGICAL COMMUNITIES

Not assessed

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated uplands

Vegetation and Flora: detailed survey (Smith, V, 1985b, Wildflower Society of WA (Inc.) Murdoch Branch 1995D); limited survey (DEP 1996 (Wire 01-02))

Structural units: mapping (Smith, V 1985b)

Uplands: *Eucalyptus calophylla* Woodland over *E. marginata*, *Banksia attenuata* and *B. menziesii* Low Woodland; *Xanthorrhoea preissii*, *Macrozamia riedlei* and *Stirlingia latifolia* Open Heath to Shrubland

Scattered Native Plants: not assessed

Vegetation Condition: >70% Very Good to Good, <30% Degraded, with areas of severe localised disturbance

Total Flora: 180 native taxa, 21 weeds (Wildflower Society of WA (Inc.), Murdoch Branch 1995D) (estimated >90% expected flora)

Significant Flora: *Jacksonia sericea* (3); *Conospermum triplinervium*, *Astroloma macrocalyx*

Fauna: limited survey by Smith, V, 1985b for reptiles (10). Significant reptile species: a gecko (*Diplodactylus alboguttatus*)

Linkage: no adjacent bushland; part of proposed Greenway 97 (Tingay, Alan & Associates 1997a); part of a regionally significant potential bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: National Trust of Australia (WA) Classification

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Rarity, Scientific or evolutionary importance, Criteria not relevant to determination of conservation value, but which may be applied when evaluating areas having similar values

Opportunities and/or Constraints

Opportunities: Bushplan Site/part Bushplan Site under MRS Parks and Recreation Reservation and TPS Landscape Zoning, Crown Reserve

Constraints: under MRS Urban Zoning, MRD regional road requirements

Recommendation: The existing purpose, care, control and management of this reserve is endorsed.



SIR FREDERICK SAMSON PARK, SAMSON

Boundary Definition: bushland taken to cadastre and zoning boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 59 **Map no.** 66 **Map sheet series ref. no.** 2033-I NW

System 6 (1983): M72 Part System area bushland, only bushland described

Other Names

Submission Area 174

Local Authorities (Suburb)

City of Fremantle (Samson)

Area (ha): total 14.0; bushland 12.6

Zoning

MRS: Urban

TPS: Open Space

Lot/Location/Reserve numbers (Purpose),

Street name

629 Sellenger Ave; 578, 630, 2465 McCombe Ave

Crown Reserve

Ownership Categories

Local Government, State Government

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Spearwood Dunes

Sands derived from Tamala Limestone (Qts: S7)

VEGETATION AND FLORA

Vegetation Complexes

Spearwood Dunes

Karrakatta Complex — Central and South

Cottesloe Complex — Central and South

Floristic Community Types

Supergroup 4: Uplands centred on Spearwood and Quindalup Dunes

28 Spearwood *Banksia attenuata* or *B. attenuata* — *Eucalyptus* woodlands

WETLANDS

No wetlands mapped

THREATENED ECOLOGICAL COMMUNITIES

Not assessed

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated uplands

Vegetation and Flora: limited survey (City of Fremantle 1989 and 1995; DEP 1996 (Sams 01); Submission No. 174)

Structural Units: mapping (City of Fremantle 1995)

Uplands: Open Forest to Woodland dominated by *Eucalyptus calophylla*, *E. marginata* and *E. gomphocephala* and combinations of these generally over *Banksia attenuata*, *B. menziesii* and *Allocasuarina fraseriana* Low Woodland; *Xanthorrhoea preissii*, *Allocasuarina humilis*, *Macrozamia riedlei* Low Shrubland; *Anigozanthos manglesii* and *Thysanotus* species Very Open Herbland

Scattered Native Plants: Open Forest to Woodland dominated by *Eucalyptus calophylla*, *E. marginata* and *E. gomphocephala* and combinations of these - regionally significant vegetation recognised as being included in the area of the Bushplan Site in need of protection

Vegetation Condition: 80% Very Good, 20% Good to Degraded, with areas of severe localised disturbance

Total Flora: 100 native taxa, 55 weeds (Appleby 1997 from City of Fremantle 1989, M. O'Byrne pers. comm., M. Appleby and DEP 1996) (estimated >80% expected flora)

Significant Flora: none recorded

Fauna: limited surveys for birds (39), native mammals (1) and reptiles (8) (City of Fremantle 1989 and Tony Baird pers. comm.). Significant bird species: category 1 (2), category 3 (3) and category 4 (3)

Linkage: no adjacent bushland

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Rarity, Criteria not relevant to determination of conservation value, but which may be applied when evaluating areas having similar values

Opportunities and/or Constraints

Opportunities: Bushplan Site/part Bushplan Site location of Scheduled Fauna; under TPS Open Space Zoning, Crown Reserve



Constraints: under MRS Urban Zoning

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 be enhanced by: amending the purpose of the reserve to include conservation; and applying appropriate mechanisms in consultation with the reserve management body.

MANNING LAKE AND ADJACENT BUSHLAND, HAMILTON HILL/SPEARWOOD

Boundary Definition: protected area boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 247 **Map no.** 66 **Map sheet series ref. no.** 2033-I NW

System 6 (1983): Part M92 area of bushland goes beyond System area boundaries, all bushland described

Other Names

Part Submission Area 336

Local Authorities (Suburb)

City of Cockburn (Spearwood, Hamilton Hill)

Ownership Categories

Local Government, State Government

Area (ha): total 86.7 (includes open water); bushland 50.6

Zoning

MRS: Parks and Recreation

TPS: Landscape

Lot/Location/Reserve numbers (Purpose),

Street name

65 Cockburn Rd; 10, 61, 63, 64, 2010 Azelia Rd; 62 Gorham Wy; 7, 9, 28 Davilak Ave; 127 Glenister Rd; 128, 129 Janson Rd; 15, 46, 980 Southend Rd; 11 Hamilton Rd
Crown Reserve

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Spearwood Dunes

Sands derived from Tamala Limestone (Qts: S7)

Tamala Limestone (Qtl: LS1)

Lagoonal and Estuarine Deposits (within the Spearwood Dunes)

Lagoonal and Estuarine Deposits (Vasse) (Qhg: Sm2)

VEGETATION AND FLORA

Vegetation Complexes

Spearwood Dunes

Cottesloe Complex — Central and South

Floristic Community Types: *not sampled, types inferred

Supergroup 2: Seasonal Wetlands

*17 *Melaleuca raphiophylla* — *Gahnia trifida* seasonal wetlands (effectively most northern occurrence)

Supergroup 4: Uplands centred on Spearwood and Quindalup Dunes

*24 Northern Spearwood shrublands and woodlands

WETLANDS

Wetland Types: lake

Natural Wetland Groups

Spearwood Dunes

Coogee (S.3)

Wetland Management Objectives: Conservation (10.8ha), Resource Enhancement

Swan Coastal Plain Lakes EPP: 10.1ha

THREATENED ECOLOGICAL COMMUNITIES

Not assessed

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: open water, vegetated wetland, vegetated uplands, limestone ridge

Vegetation and Flora: limited survey (EPA and WAWA 1990, Keighery, BJ, 1996a, Semeniuk, V&C Research Group 1997a, Weston 1993)

Structural Units: mapping (EPA and WAWA 1990, Semeniuk, V&C Research Group 1997a)

Uplands - Tamala Limestone: *Acacia rostellifera* Closed Scrub; *Melaleuca huegelii* Shrubland; Closed Heaths dominated by *Dryandra sessilis* var. *cygnorum* or *Melaleuca acerosa*; Mixed Low Shrubland; *Alyogyne huegelii* var. *glabrescens* Shrubland



Wetlands: *Melaleuca raphiophylla* Low Open Forest; *Acacia saligna* Low Open Forest to Low Woodland; Halophyte Low Shrubland, Closed Sedgeland to Sedgeland dominated by *Gahnia trifida*, *Scirpus* sp. or *Juncus kraussii*

Scattered Native Plants: *Eucalyptus decipiens* Tree Mallee; *Eucalyptus gomphocephala* Open Woodland — regionally significant vegetation recognised as being included in the area of Bushplan Site in need of protection

Vegetation Condition: >50% Good, <50% Degraded, with areas of severe localised disturbance (Weston 1993)

Total Flora: 36 native taxa, 17 weeds (Keighery, BJ, 1996a, Semeniuk, V&C Research Group 1997a) (estimated <50% expected flora)

Significant Flora: *Alyogyne huegelii* var. *glabrescens* (one of few populations in the PMR, most southern except for outlying populations in Yalgorup National Park); typical Tamala Limestone taxa — *Melaleuca huegelii*, *Grevillea preissii*, *Pimelea calcicola*

Fauna: surveyed by RAOU (1996 D), 1 visit, for birds (29). Significant birds species: category 1 (1) and category 3 (3)

Linkage: adjacent bushland, native vegetation on the south and west; part of a regionally significant potential bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: included in Beeliam Regional Park Proposal (DPUD 1992a)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Interim List of the Register of the National Estate

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Rarity, 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

Opportunities and/or Constraints

Opportunities: Bushplan Site/part Bushplan Site subject to Swan Coastal Plain Lakes EPP; location of Scheduled Fauna, conservation category wetlands; under MRS Parks and Recreation Reservation and TPS Landscape Zoning, Crown Reserve

Recommendation: The care, control and management of this area for conservation purposes within Beeliam Regional Park is endorsed.

MARKET GARDEN SWAMPS, SPEARWOOD/MUNSTER

Boundary Definition: bushland (part taken to cadastre)/bushland group boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site nos. 429, 435 **Map no.** 66, 73 **Map sheet series ref. no.** 2033-I SW, 2033-I NW **System 6 (1983):** Part M92 Part System area bushland, only bushland described

Other names

Market Garden Swamps No. 1, 2 and 3

Local Authorities (Suburb)

City of Cockburn (Munster, Spearwood)

Area (ha): total 42.2; bushland 34.9 (includes open water)

Zoning

MRS: Urban

TPS: Rural, Residential, Commercial, Lakes and Drainage, Local Road, R.O.W., P.A.W.

Lot/Location/Reserve numbers (Purpose),

Street name

3, 4, 7, 8, 9, 23 Fawcett Rd; 16, 17, 18, 19, 23 Rockingham Rd; 25, 501 Troode St; 36, 4089, 4090, 4106 Garden Rd; 17 Hamilton Rd; 4062 Watercress Gdns; 177 Okra St; 641, 4100 Blato Pl; 186, 4367 Kotisina Gdns; 299 Pennlake Dr; 2007, 2008, 4237 street not identified

Crown Reserve

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Spearwood Dunes

Sands derived from Tamala Limestone (Qts: S7)

Wetlands (within the Spearwood Dunes)

Holocene Swamp Deposits (Qhw: M6)



VEGETATION AND FLORA

Vegetation Complexes

Spearwood Dunes

Cottesloe Complex — Central and South

Floristic Community Types: *not sampled, type inferred

Supergroup 2: Seasonal Wetlands

*16 Highly saline seasonal wetlands

*17 *Melaleuca raphiophylla* — *Gahnia trifida* seasonal wetlands (in area of most northern occurrence)

WETLANDS

Wetland Types: sumpland

Natural Wetland Groups

Spearwood Dunes

Coogee (S.3)

Wetland Management Objectives: Resource Enhancement

Swan Coastal Plain Lakes EPP: 8.3ha + 7.7ha = 16ha (total)

THREATENED ECOLOGICAL COMMUNITIES

Not assessed

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: open water, vegetated wetland, vegetated uplands

Vegetation and Flora: detailed survey (Ecoscape 1995b); limited survey (EPA and WAWA 1990)

Structural Units: mapping (Ecoscape 1995b, EPA and WAWA 1990)

Uplands: *Eucalyptus gomphocephala* Open Forest; *Xanthorrhoea preissii* Shrubland

Wetlands: *Melaleuca raphiophylla* Low Open Forest; *Melaleuca cuticularis* Low Woodland to Low Open Forest;

Suaeda australis Low Open Shrubland; *Juncus kraussii* and *Gahnia trifida* Closed Sedgeland

Scattered Native Plants: *Eucalyptus gomphocephala* Open Woodland

Vegetation Condition: >50% Excellent to Very Good, <50% Good to Degraded, with areas of severe localised disturbance (Weston 1993)

Total Flora: 21 native taxa (estimated <80% expected flora, Ecoscape 1995b)

Significant Flora: none recorded

Fauna: limited survey by Ecoscape (1995b) for birds (32), native mammals (1), reptiles (7) and amphibians (3). Significant bird species by category 2 (1), category 3 (1) and category 4 (1). Significant mammal species: Quenda (Friend 1996 D and Ecoscape 1995b)

Linkage: adjacent bushland canopy south BS435 (BS261, across road); part of proposed Greenway 109 (Tingay, Alan & Associates 1997a)

Other Special Attributes: included in Beeliar Regional Park Proposal (DPUD 1992a)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Interim List of the Register of the National Estate; Location for JAMBA/CAMBA species

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, 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

Opportunities and/or Constraints

Opportunities: Bushplan Site/part Bushplan Site subject to Swan Coastal Plain Lakes EPP; under Crown Reserve

Constraints: private land; under MRS Urban Zoning

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s).

LAKE COOGEE AND ADJACENT BUSHLAND, MUNSTER

Boundary Definition: protected area/bushland taken to cadastre boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 261

Map no. 73

Map sheet series ref. no. 2033-I SW

System 6 (1983): Part M92 area of bushland goes beyond System area boundaries, all bushland described

Other names: not known

Area (ha): total 69.9 (includes open water); bushland 5.4

Local Authorities (Suburb)
City of Cockburn (Munster)

Zoning
MRS: Urban, Parks and Recreation, Important Regional Roads
TPS: Landscape, Local Road, R.O.W., P.A.W., Residential
Lot/Location/Reserve numbers (Purpose), Street name
2, 26, 55, 702, 703, 704, 2149 Fawcett Rd; 27, 28 Coogee Rd; 500, 501, 502, 503, 2124 Mayor Pl; 100, 101 street not identified
Crown Reserve

Ownership Categories

Private (including commercial organisation), State Government, Local Government

SECTION 2: REGIONAL INFORMATION

LANDFORM AND SOIL

Spearwood Dunes

Sands derived from Tamala Limestone (Qts: S7)

Tamala Limestone (Qtl: LS1)

Wetlands (within the Spearwood Dunes)

Holocene Swamp Deposits (Qhw: M6)

VEGETATION AND FLORA

Vegetation Complexes

Spearwood Dunes

Cottesloe Complex — Central and South

Floristic Community Types: *not sampled, type inferred

Supergroup 2: Seasonal Wetlands

*16 Highly saline seasonal wetlands

*17 *Melaleuca rhapsiophylla* — *Gahnia trifida* seasonal wetlands

WETLANDS

Wetland Types: lake, sumpland

Natural Wetland Groups

Spearwood Dunes

Coogee (S.3)

Wetland Management Objectives: Conservation (53ha), Resource Enhancement

Swan Coastal Plain Lakes EPP: 55.5ha

THREATENED ECOLOGICAL COMMUNITIES

Not assessed

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: open water (salt), vegetated wetland, vegetated uplands

Vegetation and Flora: limited survey (EPA and WAWA 1990, Weston 1993)

Structural Units: mapping (EPA and WAWA 1990)

Uplands - Sands derived from Tamala Limestones: *Eucalyptus gomphocephala* Woodland; *Eucalyptus marginata* Woodland; *Eucalyptus decipiens* Open Tree Mallee; *Melaleuca acerosa* and *Phyllanthus calycinus* Open Heath; *Xanthorrhoea preissii* Tall open Shrubland

Wetlands: *Melaleuca rhapsiophylla* Open Forest; *Melaleuca cuticularis* Low Woodland to Low Closed Forest; Mixed Closed Sedgeland

Scattered Native Plants: *Eucalyptus gomphocephala* Low Open Woodland

Vegetation Condition: >10% Good, <90% Degraded, with areas of severe localised disturbance (Weston 1993)

Total Flora: 71 native taxa (estimated >50% expected flora)

Significant Flora: none recorded

Fauna: surveyed by RAOU (1996 D), 5 visits, for birds (71). Significant birds species: category 1 (1), category 3 (9) and category 4 (7). Significant mammal species: Quenda (Friend 1996 D)

Linkage: adjacent bushland to the north (BS435, across road); part of proposed Greenway 109 (Tingay, Alan & Associates 1997a)

Other Special Attributes: included in Beeliar Regional Park Proposal (DPUD 1992a); largest area of non-estuarine *Melaleuca cuticularis* Low Woodland to Low Closed Forest in the PMR

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Interim List of the Register of the National Estate



SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Rarity, 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

Opportunities and/or constraints

Opportunities: Bushplan Site/part Bushplan Site subject to Swan Coastal Plain Lakes EPP; location of Scheduled Fauna, conservation category wetlands; under MRS Parks and Recreation Reservation and TPS Landscape Zoning, Crown Reserve

Constraints: private land; under MRS Urban Zoning, MRD regional road requirements, General Mineral Resource Area (limestone)

Recommendation: The care, control and management of this area for conservation purposes within Beeliam Regional Park is endorsed.

BROWMAN SWAMP, MT BROWN LAKE AND ADJACENT BUSHLAND, HENDERSON/NAVAL BASE

Boundary Definition: protected area/bushland (part taken to cadastre)/conservation wetland 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. 346 **Map no.** 73, 80 **Map sheet series ref. no.** 2033-I SW

System 6 (1983): M91 and part M92 Part System area bushland and part scattered native plants (canopy), all vegetation described

Other Names

Henderson Regional Open Space, Lake Mt Brown
Local Authorities (Suburb)
 City of Cockburn (Henderson), Town of Kwinana (Naval Base)

Area (ha): total 616.2 (includes open water); bushland 557.8

Zoning

MRS: Parks and Recreation, Industrial, Controlled Access Highways, Public Purposes-Special Uses, Important Regional Roads-subject to review
TPS: General Industry, Park, Recreation and Drainage, Landscape, Local Road, R.O.W., P.A.W.

Ownership Categories

Private (including commercial organisation), State Government, Local Government, Not identified

Lot/Location/Reserve numbers (Purpose), Street name

1, 13, 14 Russell Rd; 15 Anderson Rd; 0, 5, 7, 16, 17, 99, 652, 1740, 1841, 1868, 2855, 3000 Rockingham Rd; 2132, 2133, 2802, 2842, 3015 Cockburn Rd; 225 Sutton Rd; 303, 2905 Crane St; 150 Possner Way; 2625 Gemma Rd; 2842, 2905, 2922, 2938, 40123 street not identified
 Crown Reserve

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Spearwood Dunes

Sands derived from Tamala Limestone (Qts: S7)

Tamala Limestone (Qtl: LS1)

Quindalup Dunes (Holocene dunes)

Safety Bay Sands (Qhs: S13)

Wetlands (within the Spearwood Dunes)

Holocene Swamp Deposits (Qhw: M6)

VEGETATION AND FLORA

Vegetation Complexes

Spearwood Dunes

Cottesloe Complex — Central and South

Quindalup Dunes

Becher (Qu.2)

Floristic Community Types

Supergroup 2: Seasonal Wetlands

16 Highly saline seasonal wetlands

17 *Melaleuca raphiophylla* — *Gahnia trifida* seasonal wetlands (in area of most northerly occurrence)

Supergroup 4: Uplands centred on Spearwood and Quindalup Dunes

24 Northern Spearwood shrublands and woodlands

29a Coastal shrublands on shallow sands

WETLANDS

Wetland Types: sumpland

Natural Wetland Groups

Spearwood Dunes

Coogee (S.3)

Stakehill (S.4)

Wetland Management Objectives: Conservation (95ha)

Swan Coastal Plain Lakes EPP: 26.6ha + 17.5ha + 17.4ha = 61.5 (total)

THREATENED ECOLOGICAL COMMUNITIES

Not assessed

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: limestone ridge, tall dune, open water, vegetated wetland, vegetated uplands, limestone cliff — ocean

Vegetation and Flora: detailed survey (part Bushplan Site M91 — Keighery, GJ, and Keighery 1993c); limited survey (part Bushplan Site — Cockburn Wetlands Committee 1976, EPA and WAWA 1990, Gibson *et al.* 1994 (MTB 01–05) (Navb 01–04), Semeniuk, V&C Research 1997b)

Structural Units: mapping (part Bushplan Site — EPA and WAWA 1990, Semeniuk, V&C Research Group 1997a)

Uplands - Sands derived from Tamala Limestone: Mixed Open Woodland of *Eucalyptus gomphocephala*, *E. marginata* and *E. calophylla*; *E. marginata* Low Woodland over *Banksia attenuata* Low Open Woodland; *Banksia attenuata*, *B. menziesii* and *B. grandis* Low Woodland to Low Open Forest; *Acacia pulchella* and *Jacksonia furcellata* Open Shrubland to Tall Open Scrub

Uplands - Tamala Limestone: Tree Mallee dominated by *Eucalyptus foecunda* or *E. decipiens*; Shrublands dominated by *Acacia rostellifera* or *A. cyclops*; Tall Open Scrub to Closed Tall Scrub dominated by *Melaleuca huegelii* and/or *Dryandra sessilis* var. *cygnorum*; *Melaleuca acerosa*, *Hibbertia hypericoides* and *Acacia cochlearis* Open Heath; Mixed Closed Low Heath; Open Low Heath dominated by *Grevillea vestita*, *Frankenia pauciflora* or *Acanthocarpus preissii*; *Lepidosperma gladiatum* Sedgeland

Wetlands: *Melaleuca raphiophylla* Low Woodland to Low Closed Forest; *Melaleuca teretifolia* Low Open Forest; *Frankenia pauciflora* and *Sarcocornia quinqueflora* Closed Low Heath; Sedgelands dominated by *Gahnia trifida* or *Baumea juncea*

Scattered Native Plants: *Eucalyptus gomphocephala* Open Woodland

Vegetation Condition: >80% Very Good, <20% Good to Degraded, with areas of severe localised disturbance (Weston 1993)

Total Flora: 145 native taxa, 74 weeds (compiled from Keighery, GJ, and Keighery 1993c and Semeniuk, V&C Research Group 1997b) (estimated >75% of expected flora)

Significant Flora: Keighery, GJ, and Keighery 1993c—*Wilsonia backhousei* and *Lawrenzia spicata* (normally associated with saline wetlands), *Lavatera plebeia* var. *tomentosa* and *Wilsonia humilis* (normally confined to offshore islands; *Lavatera plebeia* var. *tomentosa* is the only mainland record), *Kennedia coccinea* (becoming increasingly uncommon on the western margins of the Plain), *Hemigenia barbata* (uncommon on the Plain, associated with Tamala Limestones, most southern population known); typical Tamala Limestone taxa — *Melaleuca huegelii*, *Grevillea preissii*, *Eucalyptus foecunda*, *Pimelea calcicola*, *Trymalium ledifolium* subsp. *ledifolium*, *Hibbertia spicata* subsp. *leptotheca*

Fauna: no systematic survey. Significant mammal species: Quenda (Friend 1996 D)

Linkage: adjacent bushland to the south, east and west; part of proposed Greenways 90, 1 (Tingay, Alan & Associates 1997a); part of a regionally significant contiguous bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: majority included in Beeliar Regional Park Proposal (DPUD 1992a); Keighery, BJ, (1996) in an assessment of the Beeliar Wetlands recognised the importance of the Site in containing landscape, vegetation, flora and wetlands typical of the Spearwood Dunes in a contiguous sequence from the coast inland to the wetlands, the presence of vegetated limestone cliffs in this sequence being unique in the PMR; Semeniuk, V&C Research Group (1997b) in a study of 22 bushland reserves in the City of Cockburn found in relation to this Bushplan Site that the value of the four reserves (Coastal Reserve M91, Henderson Regional Open Space, Brownman Swamps, Lake Mt Brown) outweighed the value of the other separate reserves. Together the four reserves stand as an uncommon example of diversity of landforms and vegetation in the Spearwood Dunes — they illustrate the graduation of habitats in the Spearwood System from swale to ridge crest and from hinterland to coast, they provide a viable fauna refuge, the upland areas provide a buffer to the wetlands, and the two wetlands remain hydrologically linked; Brownman Swamp and Mt Brown Lake contain significant invertebrate fauna, Mt Brown Lake being the best example of its type (J. Davis pers. comm.).

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Interim List of the Register of the National Estate



SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Diversity, 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

Opportunities and/or Constraints

Opportunities: Bushplan Site/part Bushplan Site subject to Swan Coastal Plain Lakes EPP; location of conservation category wetlands; under MRS Parks and Recreation Reservation, TPS Landscape Zoning, Park Recreation and Draining Zoning, Crown Reserve

Constraints: private land; under MRS Industrial Zoning, MRD regional road requirements, General Mineral Resource Area (limestone)

Recommendation: The care, control and management of parts of this area for conservation purposes within Beeliar Regional Park is endorsed. The most appropriate mechanism for the protection of the remainder of this Bushplan Site be considered through the public comment period in consultation with the land owner(s).

MANDOGALUP ROAD BUSHLAND, HOPE VALLEY

Boundary Definition: bushland taken to cadastre boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 267 **Map no.** 74, 81 **Map sheet series ref. no.** 2033-I SW

Other Names: not known

Area (ha): total 15.9; bushland 15.7

Local Authorities (Suburb)

Zoning

Town of Kwinana (Hope Valley)

MRS: Rural

TPS: Rural A

Ownership Categories

Lot/Location/Reserve numbers (Purpose),

Private

Street name

614 Mandogalup Rd

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Spearwood Dunes

Sands derived from Tamala Limestone (Qts: S7)

VEGETATION AND FLORA

Vegetation Complexes

Spearwood Dunes

Karrakatta Complex — Central and South

Floristic Community Types: *not sampled, type inferred

Supergroup 4: Uplands centred on Spearwood and Quindalup Dunes

*28 Spearwood *Banksia attenuata* or *B. attenuata* — *Eucalyptus* woodlands

WETLANDS

No wetlands mapped

THREATENED ECOLOGICAL COMMUNITIES

Not determined

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated uplands

Vegetation and Flora: limited survey (DEP 1998 roadside observations)

Structural Units

Uplands: *Eucalyptus marginata*, *Banksia attenuata* and *Allocasuarina fraseriana* Low Open Forest with scattered emergent trees of *Eucalyptus gomphocephala*; *Jacksonia sternbergiana* Tall Open Scrub

Scattered Native Plants: not assessed

Vegetation Condition: >50% Very Good, >40% Excellent, with areas of severe localised disturbance

Total Flora: not known

Significant Flora: none recorded

Fauna: no known information

Linkage: adjacent bushland to the east

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities

Opportunities and/or Constraints

Constraints: private land

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s).

SICKLEMORE ROAD BUSHLAND, PARMELIA/CASUARINA

Boundary Definition: protected area/bushland part taken to cadastre/bushland group boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 272 **Map no. 81, 88** **Map sheet series ref. no. 2033-I SW, 2033-II NW**

Other Names

Bushland between Barney Swamp and Freeway

Local Authorities (Suburb)

Town of Kwinana (Casuarina, Orelia, Parmelia)

Area (ha): total 103.7; bushland 84.8

Zoning

MRS: Parks and Recreation, Urban, Railways, Important Regional Roads

TPS: Landscape, No Zone, Park Recreation and Drainage, Residential, Rural

Lot/Location/Reserve numbers (Purpose), Street name

1134, 1136, 1137, 1200, 1346, 1347 Thomas Rd; 27, 1202 Sicklemore Rd; 1205, 1217 Johnson Rd; 7 Bertram Rd; 1403 Nottingham Pwy; 1135 street not identified
Crown Reserve

Ownership Categories

Private, State Government, Local Government, Not identified

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Bassendean Dunes

Bassendean Sands (Qpb: S8)

Bassendean Dunes/Pinjarra Plain

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

Spearwood Dunes

Sands derived from Tamala Limestone (Qts: S7)

Wetlands (within the Bassendean Dunes)

Holocene Swamp Deposits (Qhw: Ms5)

VEGETATION AND FLORA

Vegetation Complexes

Bassendean Dunes

Bassendean Complex — Central and South

Spearwood Dunes

Karrakatta Complex — Central and South

Wetlands

Herdsmen Complex

Floristic Community Types: *not sampled, types inferred

Supergroup 2: Seasonal Wetlands

*5 Mixed shrub damplands

*11 Wet forests and woodlands

Supergroup 4: Uplands centred on Spearwood and Quindalup Dunes

*28 Spearwood *Banksia attenuata* or *B. attenuata* — *Eucalyptus* woodlands

WETLANDS

Wetland Types: sumpland, artificial channel

Natural Wetland Groups

Bassendean Dunes

Jandakot (B.3)

Spearwood—Bassendean interface

Bibra (S/B.1)

Wetland Management Objectives: Conservation (2.4ha), Resource Enhancement

Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Not assessed



SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated wetland, vegetated uplands

Vegetation and Flora: limited survey (DEP 1998, survey from roadside)

Structural Units

Uplands: Mixed *Banksia attenuata*, *B. menziesii* and *Allocasuarina fraseriana* Low Woodland with emergent *Eucalyptus marginata*

Wetlands: *Eucalyptus rudis* Woodland; *Melaleuca raphiophylla* Low Open Forest; *Melaleuca preissiana* Low Woodland to Low Open Forest over *Agonis linearifolia* Closed Tall Scrub; *Banksia ilicifolia*, *B. attenuata*, *B. menziesii* Low Woodland over patches of *Kunzea ericifolia*; *Melaleuca viminea* Tall Open Scrub; *Lepidosperma longitudinale* Closed Sedgeland

Vegetation Condition: <40% Excellent, >30% Very Good, >30% Good to Degraded, with areas of severe localised disturbance

Total Flora: not known

Significant Flora: *Diuris micrantha* (R), *Caladenia huegelii* (R); *Aponogeton hexatepalus* (4)

Fauna: no known information

Linkage: adjacent bushland to the north (BS269, across road) and east; part of proposed Greenway 93 (Tingay, Alan & Associates 1997a); part of a regionally significant contiguous bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: part Bushplan Site to be included in Beeliar Regional Park (State Government Cabinet Minute 5 May 1997)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Rarity, 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

Opportunities and/or Constraints

Opportunities: Bushplan Site/part Bushplan Site subject to Peel-Harvey Estuary EPP/SPP; location of Declared Rare Flora, conservation category wetland; under MRS Parks and Recreation Reservation, TPS Landscape Zoning, Park Recreation and Draining Zoning, Crown Reserve

Constraints: private land; under MRS Urban Zoning, MRD regional road requirements

Recommendation: The care, control and management of parts of this Bushplan Site for conservation purposes within Beeliar Regional Park is endorsed. The most appropriate mechanism for the protection of the remainder of this Bushplan Site be considered through the public comment period in consultation with the land owner(s).

PARMELIA AVENUE BUSHLAND, PARMELIA

Boundary Definition: bushland taken to cadastre and zoning boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 67

Map no. 88

Map sheet series ref. no. 2033-II NW

Other Names

Bollard Bullrush Swamp

Local Authorities (Suburb)

Town of Kwinana (Parmelia)

Area (ha): total 12.1; bushland 11.2

Zoning

MRS: Urban

TPS: Residential, Landscape

Ownership Categories

Not identified

Lot/Location/Reserve numbers (Purpose),

Street name

9 Parmelia Ave

Crown Reserve

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Spearwood Dunes

Tamala Limestone (Qfl: LS1)

Spearwood Dunes

Sands derived from Tamala Limestone (Qts: S7)

VEGETATION AND FLORA

Vegetation Complexes

Spearwood Dunes

Karrakatta Complex — Central and South

Wetlands

Herdsmen Complex

Floristic Community Types: *not sampled, type inferred

Supergroup 4: Uplands centred on Spearwood and Quindalup Dunes

*25 Southern *Eucalyptus gomphocephala* — *Agonis flexuosa* woodlands

*28 Spearwood *Banksia attenuata* or *B. attenuata* — *Eucalyptus* woodlands

WETLANDS

No wetlands mapped

THREATENED ECOLOGICAL COMMUNITIES

Not assessed

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: tall dune, vegetated uplands

Vegetation and Flora: limited survey (DEP 1998 (survey from fenceline), EPA and WAWA 1990)

Structural Units: mapping (EPA and WAWA 1990)

Uplands: Mixed *Eucalyptus gomphocephala*, *E. calophylla* Open Woodland; *Banksia attenuata*, *B. grandis* Low Open Woodland; Mixed Low Shrubland dominated by *Macrozamia riedlei* and *Acacia pulchella* with scattered *Acacia saligna* and *Jacksonia furcellata*

Scattered Native Plants: not assessed

Vegetation Condition: >90% Good to Degraded, with areas of severe localised disturbance

Total Flora: not known

Significant Flora: none recorded

Fauna: no known information

Linkage: adjacent bushland to the north, south and east; part of a regionally significant contiguous bushland/wetland linkage (Volume 2A, Map 8)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Criteria not relevant to determination of conservation value, but which may be applied when evaluating areas having similar values

Opportunities and/or Constraints

Opportunity: Bushplan Site/part Bushplan Site subject to Peel-Harvey Estuary EPP/SPP; under TPS Landscape Zoning, Crown Reserve

Constraint: under MRS Urban Zoning

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s).

LEDA AND ADJACENT BUSHLAND, LEDA

Boundary Definition: protected area/bushland (part taken to cadastre and zoning) boundary (Areas of bushland within the boundaries of the Bushplan Site are not accurately mapped.)

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 349 **Map no.** 80, 87, 88 **Map sheet series ref. no.** 2033-I SW, 2033-II NW

System 6 (1983): M104 area of bushland goes beyond System area boundaries, all bushland described

Other Names

Submission Area 224

Local Authorities (Suburb)

Town of Kwinana (Baldivis, Kwinana Beach, Postans, Medina, Calista, Leda, Wellard, East Rockingham), City of Rockingham (Baldivis, East Rockingham)

Area (ha): total 1257.038 (includes open water); bushland: 1054.231

Zoning

MRS: Urban, Rural, Parks and Recreation, Railways, Controlled Access Highways, Important Regional Roads, Public Purposes-Special Uses

TPS: Special Residential, Rural, Park Recreation and Drainage, Rural A, No Zone, Landscape, Local Roads



Ownership Categories

State Government, Commonwealth Government, Local Government, Private (including commercial organisation), Not identified

Lot/Location/Reserve numbers (Purpose), Street name

127, 176, 220 Abercrombie Rd; 49, 63, 348 Rockingham Rd; 50, 220, 303, 304, 306, 314 Thomas Rd; 617 Tasker Rd; 166 Chalk Hill Rd; 1084 Tucker St; 115 Seabrook Way; 0, 75, 76, 271, 290, 1842, 1876 Wellard Rd; 8 Westbrook St; 977, 978 Gentle Rd; 1, 89, 90, 268, 855 Mandurah Rd; 1, 94, 158, 187, 855 Mead Rd; 165, 332, 1355, 1724, 2170, 2173 Millar Rd; 254 Blacksmith Dr; 277, 331 Gilmore Ave; 330 Cessford CL; 318 Thomas Rd; 7, 44, 64, 201, 339, 1724 street not identified

Crown Reserve

Nature Reserve 33581 (Conservation of Flora and Fauna)

CALM Managed Land

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Bassendean Dunes

Bassendean Sands (Qpb: S8)

Spearwood Dunes

Sands derived from Tamala Limestone (Qts: S7)

Tamala Limestone (Qtl: LS1)

Quindalup Dunes (Holocene dunes)

Safety Bay Sands (Qhs: S13)

Wetlands (within the Spearwood and Bassendean Dunes)

Holocene Swamp Deposits (Qhw: Cps)

VEGETATION AND FLORA

Vegetation Complexes

Pinjarra Plain

Serpentine River Complex

Bassendean Dunes

Bassendean Complex — Central and South

Spearwood Dunes

Karrakatta Complex — Central and South

Cottesloe Complex — Central and South

Quindalup Dunes

Quindalup Complex

Floristic Community Types

Supergroup 2: Seasonal Wetlands

17 *Melaleuca raphiophylla* — *Gahnia trifida* seasonal wetlands

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau

21a Central *Banksia attenuata* — *Eucalyptus marginata* woodlands

Supergroup 4: Uplands centred on Spearwood and Quindalup Dunes

25 Southern *Eucalyptus gomphocephala* — *Agonis flexuosa* woodlands

28 Spearwood *Banksia attenuata* or *B. attenuata* — *Eucalyptus* woodlands (most southerly occurrence sampled)

WETLANDS

Wetland Types: sumpland, artificial channel

Natural Wetland Groups

Pinjarra Plain

Keysbrook (P.1)

Bassendean—Pinjarra transition OR Bassendean with fluvial features

Muchea (B/P.3)

Bassendean Dunes

Jandakot (B.3)

Spearwood—Bassendean interface

Bibra (S/B.1)

Spearwood Dunes

Stakehill (S.4)

Quindalup

Becher (Qu.2)

Wetland Management Objectives: Conservation (109.9ha), Multiple Use

Swan Coastal Plain Lakes EPP: 11.7ha + 4.4ha + 6.4ha + 0.5ha + 3.3ha + 3.6ha = 29.9ha (total)

THREATENED ECOLOGICAL COMMUNITIES

Not assessed



SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: open water, vegetated wetland, vegetated uplands, dune crest

Vegetation and Flora: limited survey (DEP 1996 (Leda 01-04), EPA and WAWA 1990, Gibson *et al.* 1994 (Well 01-02), Weston 1993)

Structural Units: mapping (EPA and WAWA 1990)

Uplands: *Eucalyptus marginata*, *E. gomphocephala* and *Allocasuarina fraseriana* Woodland; *Banksia menziesii*, *Eucalyptus marginata* and *Allocasuarina fraseriana* Low Woodland; *Banksia attenuata* and *B. grandis* Low Woodland; *Banksia attenuata* and *B. menziesii* Low Woodland with scattered emergent *Eucalyptus gomphocephala*; *Eucalyptus gomphocephala* Open Forest; *Acacia saligna* Low Open Forest

Wetlands: *Eucalyptus rudis* Low Open Forest to Low Forest; *Melaleuca raphiophylla* Low Open Forest to Low Closed Forest; Mixed Closed Sedgeland

Scattered Native Plants: *Eucalyptus gomphocephala* Open Woodland

Vegetation Condition: >70% Excellent to Very Good, <20% Good, 10% Degraded, with areas of severe localised disturbance (Weston 1993)

Total Flora: 129 native species and 31 weeds (estimated >60% expected flora) (DEP 1996 (Leda 01-04), Gibson *et al.* 1994 (Well 01-02))

Significant Flora: *Glischrocaryon aureum* (uncommon in the PMR)

Fauna: no systematic survey. Western Brush Wallaby known to occur (Halpern Glick Maunsell Pty Ltd and Tingay, Alan & Associates 1991). Significant mammal species: Quenda (Friend 1996 D)

Linkage: adjacent bushland to the north, south (BS356, across road), east and west; part of proposed Greenways 100, 110, 99, 93 (Tingay, Alan & Associates 1997a); part of a regionally significant contiguous bushland/wetland linkage (Volume 2A, Map 8)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed, Indicative Place on Register of the National Estate

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Rarity, 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

Opportunities and/or Constraints

Opportunities: Bushplan Site/part Bushplan Site subject to Swan Coastal Plain Lakes EPP, Peel - Harvey Estuary EPP/SPP; location of conservation category wetlands; under MRS Parks and Recreation Reservation, TPS Landscape Zoning, Park Recreation and Drainage Zoning, Crown Reserve

Constraints: private land; under MRS Urban Zoning, MRD regional road requirements, Priority and General Mineral Resource Area (limestone, sand and clay), mining tenement 28/966 (ILDA leased to WA Limestone) for limestone sand and M70/556 (CSR Readymix)

Recommendation: The existing purpose, care, control and management of Reserve (33581) is endorsed. The most appropriate mechanism for the protection of the remainder of this Bushplan Site be considered through the public comment period in consultation with the land owner(s).

STAKEHILL SWAMP, BALDIVIS

Boundary Definition: bushland/conservation wetland boundary (Areas of bushland within the boundaries of the Bushplan Site are not accurately mapped.)

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 275 Map no. 93, 99 Map sheet series ref. no. 2033-II NW, 2033-II SW

Other Names

Submission Area 262

Local Authorities (Suburb)

City of Rockingham (Baldivis)

Ownership Categories

Private (including commercial organisation)

Area (ha): total 186.3 (includes open water); bushland 176.8

Zoning

MRS: Rural

TPS: Rural, Local Roads

Lot/Location/Reserve numbers (Purpose),

Street name

596, 599, 786, 787, 788, 789, 803 Stakehill Rd; 155, 156, 593, 594, 595, 597, 598, 755, 756, 778, 782 Jarvis Rd; 101, 733, 759, 760, 763, 775 Mandurah Rd; 7, 8, 9, 732 Sixty Eight Rd; 154, 592, 754, 779, 849, 919 Eighty Rd



**SECTION 2: REGIONAL INFORMATION
LANDFORMS AND SOILS**

Spearwood Dunes

Sands derived from Tamala Limestone (Qts: S7)
Tamala Limestone (Qt: LS1)

Wetlands (within the Spearwood Dunes)

Holocene Swamp Deposits (Qhw: Cs1)

VEGETATION AND FLORA

Vegetation Complexes

Spearwood Dunes

Karrakatta Complex — Central and South

Cottesloe Complex — Central and South

Wetlands

Herdsmen Complex

Floristic Community Types: *not sampled, type inferred

Supergroup 2: Seasonal Wetlands

*17 *Melaleuca raphiophylla* — *Gahnia trifida* seasonal wetlands

WETLANDS

Wetland Types: sumpland, dampland

Natural Wetland Groups

Spearwood Dunes

Stakehill (S.4)

Wetland Management Objectives: Conservation (166.1ha)

Swan Coastal Plain Lakes EPP: 89ha + 1.9ha + 2.1ha + 30.4ha = 123.4ha (total)

THREATENED ECOLOGICAL COMMUNITIES

Not assessed

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: open water, vegetated wetland

Vegetation and Flora: limited survey (DEP 1998 roadside observations, EPA and WAWA 1990, Semeniuk, V&C Research Group 1991b)

Structural Units: mapping (EPA and WAWA 1990, Semeniuk, V&C Research Group 1991b)

Wetlands: *Melaleuca raphiophylla* Open to Closed Forest sometimes over *Juncus kraussii* Sedgeland; *Melaleuca teretifolia* Closed Heath; Sedgeland of either *Baumea articulata* or *B. juncea*

Scattered Native Plants: not assessed

Vegetation Condition: wetland — >90% Excellent to Very Good, 10% Good to Degraded, with areas of severe localised disturbance (Semeniuk, V&C Research Group 1991b)

Total Flora: not known

Significant Flora: none recorded

Fauna: no systematic survey. Significant mammal species: Quenda (Friend 1996 D)

Linkage: adjacent bushland to the north

Other Special Attributes: Wetland of 'regional significance' (Semeniuk, V&C Research Group 1991b, 1991e)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Rarity, 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 Coastal Plain Lakes EPP; location of conservation category wetlands

Constraints: private land; under General Mineral Resource Area (limestone)

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s).

CHURCHER SWAMP, BALDIVIS

Boundary Definition: bushland (part taken to cadastre)/conservation wetland boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 75

Map no. 99

Map sheet series ref. no. 2033-II SW



Other Names: not known

Area (ha): total 24.6 (includes open water); bushland 24.3

Local Authorities (Suburb)
City of Rockingham (Baldivis)

Zoning

MRS: Rural

TPS: Rural, Local Roads

Ownership Categories

Private (including commercial organisation)

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

1, 2, 3, 4, 5, 6, 7, 29 Eighty Rd; 8, 9 Stakehill Rd; 27, 28 Churcher Rd

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Spearwood Dunes

Sands derived from Tamala Limestone (Qts: S7)

Wetlands (within the Spearwood Dunes)

Holocene Swamp Deposits (Qhw: Scp)

VEGETATION AND FLORA

Vegetation Complexes

Spearwood Dunes

Karrakatta Complex — Central and South

Floristic Community Types: *not sampled, types inferred

Supergroup 2: Seasonal Wetlands

*17 *Melaleuca raphiophylla* — *Gahnia trifida* seasonal wetlands

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau

*21a Central *Banksia attenuata* — *Eucalyptus marginata* woodlands

Supergroup 4: Uplands centred on Spearwood and Quindalup Dunes

*25 Southern *Eucalyptus gomphocephala* — *Agonis flexuosa* woodlands

WETLANDS

Wetland Types: sumpland

Natural Wetland Groups

Spearwood Dunes

Stakehill (S.4)

Wetland Management Objectives: Conservation (16.7ha)

Swan Coastal Plain Lakes EPP: 11.3ha

THREATENED ECOLOGICAL COMMUNITIES

Not assessed

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: open water, vegetated wetland

Vegetation and Flora: limited survey (DEP 1998 roadside observations, Semeniuk, V&C Research Group 1991b)

Structural Units: mapping (Semeniuk, V&C Research Group 1991b)

Uplands: *Eucalyptus gomphocephala* Very Open Woodland; Mixed *Banksia menziesii*, *B. attenuata*, *B. ilicifolia* and *Allocasuarina fraseriana* Low Woodlands

Wetlands: *Melaleuca raphiophylla* Low Woodland to Low Closed Forest occasionally with emergent *Eucalyptus rudis*; Mixed Sedgelands

Vegetation Condition: >60% Excellent, >25% Very Good to Good, 15% Degraded, with areas of severe localised disturbance

Total Flora: not known

Significant Flora: not surveyed

Fauna: no systematic survey. Significant mammal species: Quenda (Friend 1996 D)

Linkage: adjacent bushland to the north and west (areas of bushland to the north are incorrectly mapped)

Other Special Attributes: Wetland of 'regional significance' (Semeniuk, V&C Research Group 1991b, 1991e)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Rarity, 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 Coastal Plain Lakes EPP; location of conservation category wetland



Constraints: private land

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s).

CASSIA DRIVE BUSHLAND, KARNUP

Boundary Definition: bushland (part taken to cadastre)/management boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 278 **Map no.** 99 **Map sheet series ref. no.** 2033-II SW

Other Names: not known

Area (ha): total 54.2; bushland 53.9

Local Authorities (Suburb)

Zoning

City of Rockingham (Karnup)

MRS: Urban Deferred, Rural, Important Regional Roads

TPS: Special Rural, Landscape

Ownership Categories

Lot/Location/Reserve numbers (Purpose),

Private

Street name

10 Fletcher Rd; 877, 878 Stakehill Rd

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Spearwood Dunes

Sands derived from Tamala Limestone (Qts: S7)

VEGETATION AND FLORA

Vegetation Complexes

Spearwood Dunes

Karrakatta Complex — Central and South

Floristic Community Types: *not sampled, types inferred

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau

*21a Central *Banksia attenuata* — *Eucalyptus marginata* woodlands

Supergroup 4: Uplands centred on Spearwood and Quindalup Dunes

*25 Southern *Eucalyptus gomphocephala* — *Agonis flexuosa* woodlands

WETLANDS

No wetlands mapped

THREATENED ECOLOGICAL COMMUNITIES

Not assessed

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: dune crest, vegetated uplands

Vegetation and Flora limited survey (DEP 1998 roadside observations, Mattiske Consulting Pty Ltd 1997)

Structural Units

Uplands: *Eucalyptus gomphocephala* Woodland; *Eucalyptus gomphocephala* and *E. marginata* Open Woodland to Closed Forest; *Banksia attenuata*, *B. menziesii* and *Allocasuarina fraseriana* Low Open Woodland to Low Woodland

Scattered Native Plants: *Eucalyptus gomphocephala* and *E. marginata* Low Open Woodland

Vegetation Condition: Very Good, with areas of severe localised disturbance (Mattiske Consulting Pty Ltd 1997)

Total Flora: not known

Significant Flora: not surveyed

Fauna: no known information

Linkage: adjacent bushland canopy to the north, south, east and west

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities

Opportunities and/or Constraints

Opportunities: Bushplan Site/part Bushplan Site under TPS Landscape Zoning

Constraints: private land; under MRS Urban Deferred Zoning, MRD regional road requirements

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s).

ANSTEY SWAMP, KARNUP

Boundary Definition: protected area boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 379

Map no. 99

Map sheet series ref. no. 2033-II SW

Other Names

Submission Area 10

Local Authorities (Suburb)

City of Rockingham (Karnup)

Area (ha): total 287.3 (includes open water); bushland 270.2

Zoning

MRS: Parks and Recreation, Rural

TPS: Landscape, Rural

Lot/Location/Reserve numbers (Purpose),

Street name

0, 14, 702, 890, 894, 897, 898, 901 Mandurah Rd; 17, 94, 95, 96, 97, 99, 100, 103, 1394 Fletcher Rd

Crown Reserve

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Spearwood Dunes

Sands derived from Tamala Limestone (Qts: S7)

Tamala Limestone (QtI: LS1)

Wetlands (within the Spearwood Dunes)

Holocene Swamp Deposits (Qhw: Scp)

VEGETATION AND FLORA

Vegetation Complexes

Spearwood Dunes

Karrakatta Complex — Central and South

Cottesloe Complex — Central and South

Wetlands

Herdsmen Complex

Floristic Community Types: *not sampled, types inferred

Supergroup 2: Seasonal Wetlands

*17 *Melaleuca raphiophylla* — *Gahnia trifida* seasonal wetlands

Supergroup 4: Uplands centred on Spearwood and Quindalup Dunes

*24 Northern Spearwood shrublands and woodlands

*25 Southern *Eucalyptus gomphocephala* — *Agonis flexuosa* woodlands

WETLANDS

Wetland Types: sumpland, dampland

Natural Wetland Groups

Spearwood Dunes

Stakehill (S.4)

Wetland Management Objectives: Conservation (216.6ha)

Swan Coastal Plain Lakes EPP: 1.1ha + 45.6ha = 46.7ha (total)

THREATENED ECOLOGICAL COMMUNITIES

Not assessed

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: limestone area, open water, vegetated wetland, vegetated uplands

Vegetation and Flora: limited survey (DEP 1998, EPA and WAWA 1990, Keighery, GJ, 1996, Semeniuk, V&C Research Group 1991b)

Structural Units: mapping (EPA and WAWA 1990, Semeniuk, V&C Research Group 1991b)

Uplands — Sands derived from Tamala Limestone: *Eucalyptus gomphocephala* Forest to Woodland; Woodlands dominated by *Banksia attenuata* with scattered emergent *Eucalyptus marginata* and *E. gomphocephala* mixed with varying proportions of *Banksia ilicifolia*, *B. grandis*, *B. menziesii* and *Allocasuarina fraseriana*

Uplands — Tamala Limestone (possibly outside Bushplan Site boundary): *Eucalyptus decipiens* Open Tree Mallee; Low Heath dominated by *Melaleuca acerosa*, *Acacia rostellifera*, *A. cyclops* and *Allocasuarina humilis*

Wetlands: Woodlands to Forests dominated by *Eucalyptus rudis* or *E. gomphocephala*; *Melaleuca preissiana*, *Banksia littoralis* and *Acacia saligna* Low Woodland; *Melaleuca raphiophylla* Low Forest dominated by *Melaleuca teretifolia* or *M. viminea*; Sedgeland dominated by *Lepidosperma longitudinale*, *Typha domingensis*, *Baumea articulata*, *B. juncea* or *Gahnia trifida*



Vegetation Condition: >75% Excellent to Very Good, <25% Good to Degraded, with areas of severe localised disturbance (GJ Keighery pers. comm.)

Total Flora: 200 native taxa (Keighery, GJ, 1996) (estimated >60% expected flora)

Significant Flora: not surveyed

Fauna: no known information

Linkage: adjacent bushland to the south (BS395, across road) and west; part of proposed Greenway 102 (Tingay, Alan & Associates 1997a); part of a regionally significant contiguous bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: wetland of 'regional significance' (Semeniuk, V&C Research Group 1991b); majority of Bushplan Site included in Port Kennedy and Rockingham Parks proposal (Tingay, Alan & Associates 1997b)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, 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 Coastal Plain Lakes EPP; location of conservation category wetlands; under MRS Parks and Recreation Reservation and TPS Landscape Zoning, Crown Reserve

Constraints: private land; under General Mineral Resource Area (limestone)

Recommendation: The care, control and management of this area for conservation purposes within Rockingham Lakes Regional Park is endorsed. The most appropriate mechanism for the protection of the remainder of this Bushplan Site be considered through the public comment period in consultation with the land owner(s).

PAGANONI SWAMP AND ADJACENT BUSHLAND, KARNUP

Boundary Definition: protected area/bushland taken to cadastre boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 395 **Map no.** 99, 103 **Map sheet series ref. no.** 2033-II SW

Other Names

Submission Area 266 and Submission Area 151, Lot 1
cnr Paganoni and Mandurah Rds

Area (ha): total 751.0 (includes open water); bushland 740.2

Local Authorities (Suburb)

City of Rockingham (Karnup)

Zoning

MRS: Parks and Recreation, Urban Deferred, Railways

TPS: Rural, Landscape, No Zone

Ownership Categories

State Government, Private (commercial organisation)

Lot/Location/Reserve numbers (Purpose),

Street name

1, 4, 14 Mandurah Rd; 2 Paganoni Rd

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Pinjarra Plain

Guildford Formation (Qha: Cp) (associated with Serpentine River)

Bassendean Dunes

Bassendean Sands (Qpb: S8)

Spearwood Dunes

Sands derived from Tamala Limestone (Qts: S7)

Tamala Limestone (Qtl: LS1)

Wetlands (within the Spearwood Dunes)

Holocene Swamp Deposits (Qhw: Scp, Cps)

VEGETATION AND FLORA

Vegetation Complexes

Spearwood Dunes

Karrakatta Complex — Central and South

Cottesloe Complex — Central and South

Wetlands

Herdsmen Complex

Marine (lagoonal and estuarine) Deposits

Yoongarillup Complex (most northern occurrence)



Floristic Community Types: *not sampled, types inferred

Supergroup 2: Seasonal Wetlands

17 *Melaleuca raphiophylla* — *Gahnia trifida* seasonal wetlands

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau

21a Central *Banksia attenuata* — *Eucalyptus marginata* woodlands

Supergroup 4: Uplands centred on Spearwood and Quindalup Dunes

*24 Northern Spearwood shrublands and woodlands

25 Southern *Eucalyptus gomphocephala* — *Agonis flexuosa* woodlands

WETLANDS

Wetland Types: sumpland, dampland

Natural Wetland Groups

Bassendean Dunes

Gnangara (B.2)

Spearwood Dunes

Stakehill (S.4)

Coastal Plain Rivers

Goegrup (R.4)

Wetland Management Objectives: Conservation (107.8ha)

Swan Coastal Plain Lakes EPP: 4.5ha + 9.6ha + 4.1ha + 0.3 = 18.5ha (total)

THREATENED ECOLOGICAL COMMUNITIES

Not assessed

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: open water, vegetated uplands, dune crest, limestone ridge

Vegetation and Flora: detailed survey (Keighery, GJ, 1996, Semeniuk, V&C Research Group 1991d); limited survey (DEP roadside survey, Gibson *et al.* 1994 (Page 01-08))

Structural Units: mapping (Semeniuk, V&C Research Group 1991d)

Uplands — Sands derived from Tamala Limestone: *Eucalyptus gomphocephala* Forest to Woodland; Woodlands dominated by *Banksia attenuata* with scattered emergent *Eucalyptus marginata* and *E. gomphocephala* mixed with varying proportions of *Banksia ilicifolia*, *B. grandis*, *B. menziesii*, *Allocasuarina fraseriana* and *Xylomelum occidentale*

Uplands — Tamala Limestone: Low heath dominated by *Olearia axillaris*, *Melaleuca acerosa*, *Acacia truncata*, *A. cyclops* and *A. saligna*

Wetlands: Woodlands to Forests dominated by *Eucalyptus rudis*, *E. calophylla* or *E. gomphocephala*; *Melaleuca preissiana*, *Banksia littoralis* and *Acacia saligna* Low Woodland; *Melaleuca raphiophylla* Low Forest; Closed Scrub to Open Scrub dominated by *Melaleuca teretifolia* or *M. viminea*; Closed to Open Heath dominated by *Pericalymma ellipticum* alone or in combination with *Hakea varia*, *Calothamnus lateralis* and *Aotus* species; *Astartea* aff. *fascicularis* Heath; Sedgelands dominated by *Lepidosperma longitudinale*, *Baumea articulata*, *B. juncea* or *Gahnia trifida*

Vegetation Condition: >75% Excellent to Very Good, <25% Good to Degraded

Total Flora: 305 native taxa, 45 weeds (Keighery, GJ, 1996, Semeniuk, V&C Research Group 1991d) (estimated >80% expected flora)

Significant Flora: Keighery, GJ, 1996 — *Acacia benthamii* (3), *Dillwynia dillwynioides* (3), *Jacksonia sericea* (3) (in the area of most southern population); *Trachymene coerulea*, *Mesomelaena tetragona* (most western record known, generally associated with eastern side of the Swan Coastal Plain), *Senecio ramosissimus* (one of two populations known in the PMR); typical Tamala Limestone taxa — *Melaleuca huegelii*, *Grevillea preissii*, *Trymalium ledifolium* subsp. *ledifolium*

Fauna: no systematic survey. Significant mammal species: Quenda (Friend 1996 D)

Linkage: adjacent bushland to the north (BS379, across road), east (to Serpentine River) and west; part of proposed Greenways 102, 139 (Tingay, Alan & Associates 1997a); part of a regionally significant contiguous bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: Paganoni wetland is the largest in the Stakehill Suite; wetland of 'regional to international significance' (Semeniuk, V&C Research Group 1991e); majority of Bushplan Site included in Port Kennedy and Rockingham Parks proposal (Tingay, Alan & Associates 1997b)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Interim List of the Register of the National Estate

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Diversity, Rarity, Maintaining ecological processes or natural systems, 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 Coastal Plain Lakes EPP, Peel-Harvey Estuary EPP/SPP; location of conservation category wetlands; under MRS Parks and Recreation Reservation and TPS Landscape Zoning

Constraints: private land; under MRS Urban Deferred Zoning, General Mineral Resource Area (limestone), mining tenement (Main Roads Western Australia) for limestone and mining tenement 28/667 (Readymix Pty Ltd) for limestone

Recommendation: The care, control and management of parts of this area for conservation purposes within Rockingham Lakes Regional Park is endorsed. The most appropriate mechanism for the protection of the remainder of this Bushplan Site be considered through the public comment period in consultation with the land owner(s).

2.5 QUINDALUP DUNES

Part B

2.5 QUINDALUP DUNES

2.5.1 INTRODUCTION

Location, Landscape and Soils

The Quindalup Dunes are of aeolian origin, being the youngest of the dune systems on the Swan Coastal Plain. This system is characterised by a series of dunes — from the low sequence of ridges typical of the beach ridge plains of the Rockingham area to the large parabolic dunes found north of the Swan River. Broad to narrow swales and sand sheets can occur between the dunes. The dunes, swales and sheets are typically white sands (Table 1.5a&b). The wetlands of the Quindalup Dunes (Table 2.5) are characterised by carbonate mud, humic sand, peats and muddy sands over sands.

Remnant Bushland on the Quindalup Dunes

Relatively large areas of the Quindalup Dunes remain as bushland. The soils of the Quindalup Dunes have very low fertility and, until recently, have remained vegetated. However, similarly to the Spearwood Dunes, the uncleared dunes have been subject to substantial grazing pressure. While this has had low impact on the slopes of the dunes, the protected swales have been favoured as stock watering and shelter points and the vegetation in the swales has been degraded.

Recent mapping for the Perth Metropolitan Region (Table 3.5) indicates that 48 per cent of the vegetation complexes associated with the Quindalup Dunes remain as native vegetation.

Plant Communities and their Conservation on the Quindalup Dunes

At the regional level one vegetation complex (Table 3.5) has been identified as being confined to the Quindalup Dunes. A wetland complex is also associated with the Quindalup Dunes. Eleven floristic community types, three wetland types and eight upland types, are the principal regional floristic groups identified on the Quindalup Dunes in the Perth Metropolitan Region (Table 4.5).

Two floristic community types, 19 and 30a (Table 5.5 after Gibson *et al.* 1994, not as redefined by additional survey and analysis for Perth's Bushplan,

see Volume 1, Part 2, section 4.3.2: Floristic Community Types), have been determined threatened ecological communities.

A variety of vegetation associations has been identified on the Quindalup Dunes. The different associations are related to the age of the dunes on which they occur, the degree of protection from prevailing winds and the relationship between the Quindalup sands and the adjacent Tamala Limestone surfaces. These broad units and associated dominant species are:

Uplands

The main upland associations are grasslands, shrublands and less commonly woodlands to open woodlands. These broad units and associated dominant species are:

Woodlands

Eucalypts — *Eucalyptus gomphocephala*
Melaleucas — *Melaleuca lanceolata* (uncommon in the Perth Metropolitan Region)
Rottneest Island Cypress — *Callitris preissii*

Shrublands

Jacksonia furcellata, *Olearia axillaris*, *Melaleuca acerosa*, *Phyllanthus calycinus*, *Rhagodia baccata*, *Nemcia reticulata*, *Eremophila glabra*, *Scaevola crassifolia*, *S. nitida*, *Spyridium globulosum*, *Acacia lasiocarpa* var. *lasiocarpa*, *A. rostellifera*, *A. cyclops*

Herblands

Lomandra maritima, *Conostylis candicans*, *Opercularia vaginata*, *Senecio lautus*, *Acanthocarpus preissii*

Sedgeland

Loxocarya flexuosa, *Isolepis nodosus*, *Lepidosperma gladiatum*, *L. angustatum*, *Schoenus grandiflorus*

Grasslands

Spinifex hirsutus, *S. longifolius*, *Austrostipa flavescens*, *Austrodanthonia occidentalis*, *Poa porphyroclados*

Wetlands

The main wetland associations are sedgeland, shrublands and, less commonly, low woodlands to forests. These broad units and associated dominant species are:



Woodlands

Eucalypts — *Eucalyptus gomphocephala*
Melaleucas — *Melaleuca raphiophylla*, *M. cuticularis*
Others — *Acacia saligna*

Herblands

Lobelia alata

Sedgeland

Baumea juncea, *B. articulata*, *Isolepis nodosus*,
Lepidosperma gladiatum, *Gahnia trifida*

Eighteen significant taxa are associated with the Quindalup Dunes in the Perth Metropolitan Region (Table 6.5). Seven of these are Priority Flora.

Conservation of Plant Communities of the Coastal Reserves — Quindalup and Spearwood Dunes

The coastal margin of the Swan Coastal Plain is formed by the Quindalup Dunes System and Tamala Limestone surfaces which are overlaid to varying degrees by the Quindalup sands and sands derived from Tamala Limestones (Spearwood Sands). Over the past 30 years a number of regional studies of the coastal margin have been undertaken. The studies have detailed aspects of the coastal geomorphology (for example, McArthur and Bartle 1980, Searle *et al.* 1988, Semeniuk *et al.* 1989), flora and vegetation (for example, Griffin 1993, Griffin and Trudgen 1994) and fauna (How and Dell 1993). As a consequence specific criteria have been identified which should be taken into account in selecting conservation areas in the region along the coast in the metropolitan area which primarily encompasses the Quindalup Dunes. In summary these are listed under six categories as indicated below:

- (i) Quindalup Dune types: inclusion of a series of Quindalup Dune types related to distance from the coastline, age and formation process
- (ii) Continuing natural processes: sufficient size to allow for natural processes to continue
- (iii) Shoreline: soft (i.e. sandy shore of Quindalup Dunes) and/or hard (i.e. limestone platform of Tamala Limestone)

(iv) Linkage: include Quindalup, Spearwood and Bassendean Dunes

(v) Vegetation: variety of typical associations in good condition which encompasses the north—south variation found predominantly in the vegetation of the older Quindalup Dunes and the Tamala Limestones

(vi) Habitats: a variety of adjacent habitats of sufficient area to provide for the diverse reptilian and bird fauna of the coastal dunes.

While there is a considerable area of the Quindalup Dunes within the Perth Metropolitan Region with some protection, much of it is within 500 metres of the coastline. These long, narrow reserves meet few of the six criteria described above, specifically:

- (i) Quindalup Dune types: reserves only contain the youngest dunes (most coastal)
- (ii) Continuing natural processes: boundaries generally truncate youngest dunes and consequently natural processes
- (iii) Shorelines: only portions are present in narrow bands backed by an alienated landscape
- (iv) Linkage: reserves rarely link Quindalup and Spearwood Dunes, never Bassendean Dunes
- (v) Vegetation: is limited to near-coastal association; also, due to incursions of carparks, tracks for beach access and large edge-to-area ratio, is very prone to weed invasion resulting in degrading of vegetation.
- (vi) Habitats: there is a limited variety of adjacent habitats which are insufficient in area for many species.

Part B

Table 1.5a: Geological and geomorphological systems of the Quindalup Dunes. The general terms used in Perth's Bushplan for describing the major landform elements are in **bold italics**.

Major Geological Systems (after Playford et al., 1976)	Major Geomorphological Systems (after McArthur and Bettenay, 1960)	Detailed Geomorphological Units (after Churchward and McArthur, 1980)
Safety Bay Sands	Quindalup Dunes	Quindalup
Wetlands (within the Guildford Formation, Bassendean Sand, Tamala Limestone)	Not applicable	Herdsmen

Table 1.5b: Landform and soils of the Quindalup Dunes showing the relationship between geomorphological units, units identified in the Environmental Geology Maps and soils described on these maps on the Swan Coastal Plain in the Perth Metropolitan Region. Column One can be used to cross-reference to groups shown in Table 1a.

Major Geomorphological Systems after McArthur and Bettenay, (1960); *Detailed Geomorphological Units (after Churchward and McArthur, 1980)	Major Units in the Environmental Geology Maps (after various authors)	Soils associated with each unit
Quindalup Dunes: *Quindalup	Safety Bay Sands	white calcareous sands, sometimes limestone deposits
Wetlands - Quindalup Dunes (not applicable)	Holocene lagoonal/swamp deposits	dark grey and brown silts with shells and shell fragments and limestone (marl)

Table 2.5: Natural Wetland Groups (Consanguineous Suites) on the Quindalup Dunes (after Semeniuk, 1996)

Name & locations	Geomorphic setting	Primary wetlands	Stratigraphy	Origin of wetlands
Cooloongup suite (Q1) Rockingham area Shoalwater Bay & Baldivis	Quindalup Dunes/Spearwood Unit beachridge plain	Lakes	Carbonate mud overlying Becher sand or for Lake Richmond unfilled with sediment	Wetlands originated as barred oceanic basins as part of the prograding shoreline, now freshwater recharged
Becher suite (Q2) Between Safety Bay & Peelhurst, in the coastal dune area; locally at Preston	Quindalup Dunes - specifically the small scale plain of parallel beachridges	Sumplands & damplands	Humic sand or peat & thin carbonate mud overlying Safety Bay sand	Wetlands are a series of primary inter-ridge depressions which intersect or lie close to the water table in a prograding coastal beachridge plain
Peelhurst suite (Q3) Narrow strip, 3km long along the coast south of Becher Point; locally along the west shore of Lake Walyungup & in isolated areas such as Whitfords cusp	Quindalup Dunes - specifically area of semi-mobile dunes & blowout depressions	Sumplands & damplands	Safety Bay Sand overlain by (carbonate) muddy sand	Wetlands are basins deflated to the level of the water table by prevailing onshore winds

Table 3.5: Vegetation complexes (Hedde et al., 1980) and percentage remaining as native vegetation (AgWA, 1998 GIS) on the Quindalup Dunes in the Perth Metropolitan Region

Vegetation Complex	Native Vegetation (%)
Quindalup Dunes	
QUINDALUP COMPLEX: Coastal dune complex consisting mainly of two alliances – the strand and foredune alliance and the mobile and stable dune alliance. Local variations include the low closed forest of <i>Melaleuca lanceolata</i> – <i>Callitris preissii</i> and the closed scrub of <i>Acacia rostellifera</i> .	48
Wetlands	
HERDSMAN COMPLEX: Sedgeland and fringing woodland of <i>Eucalyptus rudis</i> – <i>Melaleuca</i> species	31

Table 4.5: Floristic community types identified on the Quindalup Dunes (after Gibson et al., 1994, and DEP, 1996)

Key

Column 1: Floristic Community Type Codes

The numbers of the types additional to Gibson et al. (1994) are italicised if they are subsets of an existing group (in types 19, 20, 23 and 30) and italicised and preceded by 'S' if they are supplementary groups.

Column 2: General Description of Floristic Community Types

Descriptions are based on generalised information from all plots in the group. Structural units are categorised into forest, woodlands, shrublands, sedgelands and herblands after Gibson et al. (1994).

Column 3: Average Species Richness per Floristic Community Type

Average species richness per 10x10m plot less those species only occurring in a single plot. Some community types can have a high proportion of single records. Thus these estimates of average species richness are underestimates in some cases.

Supergroup 2 – Seasonal Wetlands

17	<i>Melaleuca raphiophylla</i> – <i>Gahnia trifida</i> seasonal wetlands	13.4
19a	Sedgelands in Holocene dune swales	25.0
19b	Woodlands over sedgelands in Holocene dune swales	26.3

Supergroup 4 – Uplands centred on Spearwood and Quindalup Dunes

Quindalup Dunes

29a	Coastal shrublands on shallow sands	33.7
29b	<i>Acacia</i> shrublands on taller dunes	34.2
30a2	<i>Callitris preissii</i> and/or <i>Melaleuca lanceolata</i> forests & woodlands	17.5
30c2	Woodlands and shrublands on Holocene dunes	23.9
30b	Quindalup <i>Eucalyptus gomphocephala</i> and/or <i>Agonis flexuosa</i> woodlands	35.0
S11	Northern <i>Acacia rostellifera</i> – <i>Melaleuca acerosa</i> shrublands	21.0
S13	Northern <i>Olearia axillaris</i> – <i>Scaevola crassifolia</i> shrublands	18.8
S14	<i>Spinifex longifolius</i> grassland and low shrublands	8.6

Part B

Table 5.5: Threatened ecological communities (English and Blyth, 1997) on the Quindalup Dunes

KEY

CR Critically Endangered

EN Endangered

VU Vulnerable

* Community further defined by DEP (1996); here as identified by Gibson et al. (1994)

A. Floristic Community Types

Supergroup 2 – Seasonal Wetlands

19* Sedgelands in Holocene dune swales CR

Supergroup 4 – Uplands centred on Spearwood and Quindalup Dunes

Quindalup Dunes

30a* *Callitris preissii* and/or *Melaleuca lanceolata* forests and woodlands VU

B: Restricted floristic community type mosaics (not applicable)

C: Freshwater communities

Stromatalite-like community of coastal freshwater lakes (Lake Richmond, Moore 1993) CR

Table 6.5: Significant flora of the Quindalup Dunes in the Perth Metropolitan Region

Key

Column 1 Taxon

Names follow Gibson *et al.* (1994) unless indicated otherwise. Taxa yet to be named have an attached reference collection number from the relevant collector. An 'ms' after the name indicates that this is a manuscript name which is yet to be published.

Column 2 Major landform elements

- DS = Darling Scarp
- D = Dandaragan Plateau
- F = Foothills
- P = Pinjarra Plain
- B = Bassendean Dunes
- S = Spearwood Dunes
- Q = Quindalup Dunes
- R = Estuaries, Rivers and Creeks
- int = interface of two units
- (ML) = Muchea Limestones
- (TL) = Tamala Limestones

Column 3 Taxa dependent on seasonal waterlogging or inundation

- W = depends on waterlogging or inundation of area
- W (aquatic) = depends on standing water

Column 4 Conservation status (Atkins 1998)

- R = Declared Rare Flora
- 1 = Priority 1: Poorly Known Taxa
- 2 = Priority 2: Poorly Known Taxa
- 3 = Priority 3: Poorly Known Taxa
- 4 = Priority 4: Rare Taxa

Column 5 Regional ecological preferences

- e = taxa endemic to the Swan Coastal Plain
- E = taxa endemic to the Swan Coastal Plain in the Perth Metropolitan Region

Geographical Variation

- r = populations at the northern or southern limit of their known geographic range
- d = populations disjunct from their known geographic range
- p = considered to be poorly reserved (applies to all Declared Rare Flora and Priority taxa)
- s = significant populations (applies to all Declared Rare Flora and Priority taxa)
- X = considered lost in the Perth Metropolitan Region

Taxon	Major landform element	Wetland taxa	DRF/ Priority code	Significance code
<i>Acacia littorea</i>	S/Q			d
<i>Allocasuarina lehmanniana</i>	Q			s
<i>Alyogyne huegelii</i> var. <i>glabrata</i>	Q/S			s
<i>Astroloma microcalyx</i>	S/Q			s
<i>Carpobrotus modestus</i>	Q/S			s
<i>Callitris preissii</i>	Q			s, E
<i>Chamaelucium uncinatum</i>	Q			r
<i>Conostylis bracteata</i>	Q		3	p, s, e
<i>Conostylis pauciflora</i> subsp. <i>pauciflora</i>	Q		4	p, s, e
<i>Conostylis pauciflora</i> subsp. <i>euryrhipis</i>	Q		3	p, s
<i>Diplolaena angustifolium</i>	Q/S			p
<i>Kennedia coccinea</i>	Q/S (TL)			s
<i>Lasiopetalum membranaceum</i>	S/Q		3	p, s
<i>Lechenaultia linarioides</i>	S/Q			p
<i>Lepidium puberulum</i>	Q		4	X
<i>Melaleuca lanceolata</i> (only Garden Island)	Q/S			d, s
<i>Sarcosoma bicarinata</i> (<i>Carpobrotus</i> sp. Hepburn (GJK 11518))	S/Q		3	p, s, e
<i>Stylidium maritima</i> ms	S (TL)/Q		3	p, s, e

QUINDALUP DUNES

2.5.2 DESCRIPTIONS

Bushplan Site No.	Bushplan Map No.	System 6	Bushplan Site Name	Page No.
406	1, 2, 3, 4, 5, 6, 7, 8		Wilbinga-Caraban Bushland	331
397	6, 7, 12, 13, 17, 24, 25, 31	M1 M2	Coastal Strip from Wilbinga to Mindarie	333
289	13, 17		Ningana Bushland, Yanchep/Eglington	335
322	31	M2	Burns Beach Bushland	336
323	31	M6	Link from Burns Beach Bushland to Neerabup National Park	338
325	31, 37, 43	M8	Coastal Strip from Burns Beach to Hillarys	340
308	44, 49	M36	Trigg Bushland and Adjacent Coastal Reserve, Trigg/Scarborough	341
310	49		Floreat Beach Bushland, City Beach/Scarborough	343
315	55	M46	Swanbourne Bushland, Swanbourne/City Beach	344
341	66, 72, 73	M90	Woodman Point, Coogee/Munster	346
473	65, 71	C46	Carnac Island	348
63	71, 78, 79	M96	Garden Island	349
355	85, 86		Point Peron and Adjacent Bushland, Peron/Shoalwater Bay	350
358	86	M102	Lake Richmond, Rockingham	352
367	86	M101	Penguin, Seal, Bird and Gull Islands and Shag Rock	354
356	87, 93, 99	M103	Lake Cooloongup, Lake Walyungup and Adjacent Bushland, Hillman to Port Kennedy	355
377	92, 98, 99	M106	Port Kennedy	358



WILBINGA-CARABAN BUSHLAND

Boundary Definition: protected area/bushland taken to cadastre boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 406 **Map no.** 1, 2, 3, 4, 5, 6, 7, 8 **Map sheet series ref. no.** 2035-III SE, 2035-III SW

System 6 (1983): Part M1, C12 area of bushland goes beyond System area boundaries, all bushland described

Other Names

Submission Area 217

Local Authorities (Suburb)

Shire of Gingin (Two Rocks, Wilbinga, Caraban), Shire of Wanneroo (Yanchep)

Ownership Categories

State Government

Area (ha): total 9683.3; bushland 9158.3

Zoning

MRS: Urban Deferred, Rural, Parks and Recreation

TPS: Landscape, Ocean, Parks and Recreation, Rural, Public Use, Roads

Lot/Location/Reserve numbers (Purpose), Street name

5611, 8185, 9755, 9756, 9757, 10651, 10652, 10692 street not identified

Crown Reserve

Reserve 39412 (Quarry (limestone), State Forest 65

CALM Managed Land

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Spearwood Dunes

Sands derived from Tamala Limestone (Qts: S7)

Tamala Limestone (Qtl)

Quindalup Dunes (Holocene dunes)

Safety Bay Sands (Qhs: S1, S2, S13, LS4)

VEGETATION AND FLORA

Vegetation Complexes

Spearwood Dunes

Cottesloe Complex — North

Quindalup Dunes

Quindalup Complex

Floristic Community Types: *not sampled, type inferred

Supergroup 4: Uplands centred on Spearwood and Quindalup Dunes

26a *Melaleuca huegelii* — *M. acerosa* shrublands of limestone ridges

26b Woodlands and mallees on limestone

27 Species poor mallees and shrublands on limestone

28 Spearwood *Banksia attenuata* or *B. attenuata* — *Eucalyptus* woodlands

29a Coastal shrublands on shallow sands

29b *Acacia* shrublands on taller dunes

*S11 Northern *Acacia rostellifera* — *Melaleuca acerosa* shrublands

S13 Northern *Olearia axillaris* — *Scaevola crassifolia* shrublands

*S14 *Spinifex longifolius* grassland and low shrubland

WETLANDS

No wetlands mapped

THREATENED ECOLOGICAL COMMUNITIES

Not assessed, Not determined

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: limestone sheets overlaid by Quindalup and Spearwood sands, limestone ridges, younger to older Quindalup Dunes, vegetated uplands

Vegetation and Flora: detailed survey (part Bushplan Site — Trudgen *et al.* 1990); limited survey (DEP 1996 (Wilb 01-10), Gibson *et al.* 1994 (She 01-06; Nwil 01, 03))

Structural Units: mapping (Trudgen *et al.* 1990)

Spearwood Dunes

Uplands - Sands derived from Tamala Limestone: *Eucalyptus gomphocephala* Open Forest to Woodland; *Eucalyptus todtiana*, *Banksia attenuata* and *B. menziesii* Low Open Forest; *Banksia attenuata* and *B. menziesii* Low Woodland; *Eucalyptus decipiens* Low Open Forest; *Banksia ilicifolia* Low Woodland

Uplands - Tamala Limestone: Closed Low Heaths, Closed to Open Heaths and Tall Scrub dominated by *Melaleuca cardiophylla*, *M. huegelii* and *Westringia dampieri* (uncommon near the coast), and by *Melaleuca acerosa*, *Baeckea robusta*, *Calothamnus quadrifidus* and *C. sanguineus* distant from the coast; *Dryandra sessilis* var. *cygnorum*, *Acacia truncata*, *A. lasiocarpa*, *Hibbertia hypericoides*, *Scaevola repens*, *Rhagodia baccata*, *Hardenbergia comptoniana* and combinations of these; occasional patches of *Eucalyptus foecunda* Closed Mallee Heath

Quindalup Dunes

Older dunes and plains: Open Low Heaths dominated by *Melaleuca acerosa*, *Acacia rostellifera*, *Hibbertia racemosa* over Herblands dominated by *Lomandra maritima*, *Conostylis candicans*, *Opercularia vaginata*, *Acanthocarpus preissii* and combinations of these; occasional *Eucalyptus gomphocephala* trees

Younger dunes: Open Low Heaths to Shrubland dominated by *Myoporum insulare*, *Scaevola crassifolia*, *Spyridium globulosum*, *Acacia rostellifera* and *Olearia axillaris*

Strand: *Spinifex longifolius* and *S. hirsutus* Grasslands

Scattered Native Plants: not assessed

Vegetation Condition: >70% Excellent to Pristine, <30% Very Good to Good, with areas of localised disturbance associated with previous grazing pressure (mapping, Trudgen *et al.* 1990)

Total Flora: 219 native taxa, 21 weeds (Trudgen *et al.* 1990), estimated >75% expected flora

Significant Flora: *Eucalyptus argutifolia* (R, also Submission no. 146), *Acacia benthamii* (2), *Hibbertia spicata* subsp. *leptotheca* (3), *Stylidium maritimum* (3); *Conostylis pauciflora* subsp. *euryrhipis* (3, Trudgen *et al.* 1990); *Pimelea calcicola*, *Trachymene coerulea*, *Stylidium crossocephalum*, *Lechenaultia linarioides*, *Melaleuca cardiophylla*, *Conospermum triplinervium*, *Alyogyne huegelii* var. *glabrata*, *Alyogyne huegelii* var. *huegelii* ms (only known co-occurrence of these two taxa and of hybrids), *Allocasuarina lehmanniana*, *Hydrocotyle diantha* (most northerly population, Griffin and Trudgen 1994), *Leucopogon tenuis* (atypical form, possibly new taxon Submission no. 146); typical Tamala Limestone taxa - *Schoenus latitans*, *Acacia alata* var. *tetrantha*, *Grevillea preissii*, *Petrophile* aff. *brevifolia* (pink flowered form), *Petrophile serruriae* subsp. nov. (GJK 11421), *Trymalium ledifolium* subsp. *ledifolium*, *Astroloma microcalyx*

Fauna: limited survey for birds (45), native mammals (2) and reptiles (18) (Ninox Wildlife Consulting 1991 and Submission no. 146). Significant bird species: category 1 (1), category 3 (7) and category 4 (8). Good assemblage of insectivorous and nectarivorous birds. Significant mammal species: Western Brush Wallaby. Significant reptile species: Carpet Python (*Morelia spilota*) and Barking Gecko (*Underwoodisaurus millii*)

Linkage: adjacent bushland to the north and south (BS397, BS284, BS396); part of proposed Greenway 37 (Tingay, Alan & Associates 1997a); part of a regionally significant contiguous bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes

Meets all six specific coastal reserve criteria —

- (i) Quindalup Dune types: low, well separated dunes perched on gently undulating Spearwood (Tamala) Limestone surface, younger dunes on coast steeper with little plain between them; ages of dunes range from blowouts to Q1, most being Q2 or Q3 in age (Griffin and Trudgen 1994)
- (ii) Continuing natural processes: Quindalup Dunes extending to 5.8kms inland
- (iii) Shoreline: sandy shoreline
- (iv) Linkage: contains Quindalup/Spearwood Dunes interface (and connects to area of Spearwood/Bassendean Dunes interface)
- (v) Vegetation: contains nine regional floristic groups, one group (floristic community type 26a) having been recommended as a 'critically threatened community' (Weston and Gibson 1997); the 'most important feature of the Wilbinga site is its diversity of vegetation in good (that is, very good) condition' (Trudgen *et al.* 1990)
- (vi) Habitats: see Fauna section above;

Contains at least nine regional floristic groups, one group (limestone floristic community type 26a) having been recommended as a 'critically threatened community' (Weston and Gibson 1997); part Bushplan Site proposed to become Conservation Park and 5g CALM Act Reserve in Forest Management Plan 1994-2003 (CALM 1994); 'Locations 9755, 9756 and 9767 should be reserved for the conservation of Flora and Fauna and added to the Caraban Management Priority Area' (Griffin and Trudgen 1994); part Bushplan Site included in Gngangara Park proposal (Bailey 1997)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Diversity, Rarity, Maintaining ecological processes or natural systems, 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 Gnangara Mound Crown Land EPP; location of Declared Rare Flora and Scheduled Fauna; under MRS Parks and Recreation Reservation and TPS Landscape Zoning and Parks and Recreation Zoning, Crown Reserve

Constraints: private land; MRS Urban Deferred Zoning

Recommendations: The State Forest portion of the Bushplan Site be reserved for Conservation Park and Section 5g CALM Act Reserve (in accordance with Forest Management Plan 1994-2003, CALM 1994); The remaining portion of the site, including Wilbinga, to be added to the proposed Conservation Park.

COASTAL STRIP FROM WILBINGA TO MINDARIE

Boundary Definition: protected area boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 397 **Map no.** 6, 7, 12, 13, 17, 24, 25, 31 **Map sheet series ref. no.** 2034-IV NE, 2034-IV NW, 2034-IV SE, 2035-III SW

System 6 (1983): Part M1, M2 area of bushland goes beyond System area boundaries, all bushland described

Other Names

Submission Area 238

Local Authorities (Suburb)

Shire of Wanneroo (Alkimos, Yanchep, Eglinton, Jindalee, Quinns Rocks, Two Rocks, Mindarie)

Area (ha): total 549.4; bushland 402.2

Zoning

MRS: Parks and Recreation, Urban, Urban Deferred, Waterways, Rural

TPS: Rural, Urban Development, Residential Development, Ocean, Marina Development Zone, Landscape

Ownership Categories

State Government, Local Government, Private (including commercial organisation)

Lot/Location/Reserve numbers (Purpose), Street name

7019, 11170 Ocean Dr; 211 Quinns Rd; 211, 11186 Kinsale Dr; 77, 280, 9917, 12037 Rosslare Prom; 2, 133, 135, 8313, 8613, 8999, 9306, 9918 Two Rocks Rd; 134 Yanchep Beach Rd; 101 Romeo Rd; 11 Pipidiny Rd; 612 Hornpipe Ct; 8289, 9740, 10603 Wilkie Ave; 12222 Jordan St; 12835 Foreshore Vsta; 503 Toreopango Ave; 304 Two Rocks Rd; 220 Shearwater Ave; 504 Sovereign Dr; 1, 9, 12 Marmion Ave; 1000 Lisford Ave; 9131 Brazier Rd; 108, 312, 8508, 8984, 8989, 9307, 9321, 9917, 10538, 12489 street not identified
Crown Reserve

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Spearwood Dunes

Sands derived from Tamala Limestone (Qts: S7)

Tamala Limestone (Qtl: LS1, LS3)

Quindalup Dunes (Holocene dunes)

Safety Bay Sands (Qhs: S1, S2, S3)

VEGETATION AND FLORA

Vegetation Complexes

Spearwood Dunes

Cottesloe Complex — Central and South

Quindalup Dunes

Quindalup Complex

Floristic Community Types: *not sampled, types inferred

Supergroup 2: Seasonal Wetlands

*16 Highly saline seasonal wetlands

Supergroup 4: Uplands centred on Spearwood and Quindalup Dunes

*29a Coastal shrublands on shallow sands

*29b *Acacia* shrublands on taller dunes

*S11 Northern *Acacia rostellifera* — *Melaleuca acerosa* shrublands

*S13 Northern *Olearia axillaris* — *Scaevola crassifolia* shrublands

*S14 *Spinifex longifolius* grasslands and low shrublands

WETLANDS

No wetlands mapped (wetland identified above is the *Frankenia pauciflora* Low Shrubland)

THREATENED ECOLOGICAL COMMUNITIES

Not assessed, Not determined

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: ocean — limestone cliff, tall dune

Vegetation and Flora: detailed survey (part Bushplan Site — Robinson 1995, Trudgen and Keighery 1990a&b); limited survey (Hames Sharley Australia 1992; part Bushplan Site — Le Provost *et al.* 1984, Semeniuk, V&C Research Group 1991b)

Structural Units: mapping (Hames Sharley Australia 1992; part Bushplan site — Robinson 1995, Trudgen and Keighery 1990a&b, Le Provost *et al.* 1984)

Spearwood Dunes

Uplands - Tamala Limestone: Closed to Open Low Heaths and Closed to Open Heaths dominated by *Melaleuca cardiophylla* (uncommon), *M. huegelii* (uncommon), *Dryandra sessilis* var. *cygnorum* or *Acacia truncata*; *Frankenia pauciflora* Low Shrubland (uncommon)

Quindalup Dunes

Older dunes and plains (limited area, atypical so close to coast): Open Low Heaths to Shrublands dominated by *Melaleuca acerosa*, *Acacia rostellifera* or *Olearia axillaris*

Younger dunes: Open Low Heaths to Shrubland dominated by *Myoporum insulare*, *Scaevola crassifolia*, *Spyridium globulosum*, *Acacia truncata*, *A. rostellifera* and *Olearia axillaris*

Strand: *Spinifex longifolius* and *S. hirsutus* Grasslands

Scattered Native Plants: not assessed

Vegetation Condition: ranges from near Pristine to Degraded, with areas of severe localised disturbance; see comments in Other Special Attributes (below)

Total Flora: 83 native taxa, 27 weeds (part Bushplan Site — Robinson 1995) (estimated >60% expected flora)

Significant Flora: *Conostylis pauciflora* subsp. *euryrhipis* (3), *Stylidium maritimum* (3); *Melaleuca cardiophylla*, *Lechenaultia linarioides*; typical of Tamala Limestone taxa — *Grevillea preissii*, *Diplopeltis huegelii*, *Trymalium ledifolium* subsp. *ledifolium*

Fauna: limited survey by LeProvost Environmental Consultants (1990) for birds (30), native mammals (1) and reptiles (8). Significant bird species: category 1 (1), category 3 (6) and category 4 (9)

Linkage: adjacent bushland to the north (BS406) and east (BS289); part of proposed Greenways 1, 38, 36, 4 (Tingay, Alan, & Associates 1997a); part of a regionally significant fragmented bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes

Bushplan Site constrained in meeting the specific coastal reserve criteria; four met to a limited extent —

- (i) Quindalup Dune types: predominantly younger dunes
- (ii) Continuing natural processes: 406.6ha (302.3ha of bushland) Quindalup Dunes extending to maximum of 0.8km inland but generally less, dunes truncated
- (iii) Shoreline: soft and hard (vegetated areas south of Quinns and south of Burns Beach)
- (iv) Linkage: part of semi-contiguous North—South vegetated coastal strip;

Large proportion recommended for protection in the study of City of Wanneroo bushland (Trudgen 1996)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Rarity, Maintaining ecological processes or natural systems, 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

Opportunities and/or Constraints

Opportunities: Bushplan Site/part Bushplan Site location of Scheduled Fauna; under MRS Parks and Recreation Reservation and TPS Landscape Zoning, Crown Reserve

Constraints: private land; under MRS Urban Zoning and Urban Deferred Zoning

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.



NINGANA BUSHLAND, YANCHEP/EGLINGTON

Boundary Definition: protected area boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 289 **Map no.** 13, 17 **Map sheet series ref. no.** 2034-IV NE

System 6 (1983): Part M2 area of bushland goes beyond System area boundaries, all bushland described

Other Names

Part Eglinton, part Submission Area 289

Local Authorities (Suburb)

Shire of Wanneroo (Yanchep, Eglinton)

Area (ha): total 616.9; bushland 551.5

Zoning

MRS: Urban, Parks and Recreation, Railways, Important Regional Roads

TPS: Landscape

Lot/Location/Reserve numbers (Purpose),

Street name

8 Pipidinny Rd; 103 Yanchep Beach Rd; 101, 105, 109 Mitchell Fwy

Crown Reserve

Ownership Categories

State Government, Private (commercial organisation)

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Spearwood Dunes

Sands derived from Tamala Limestone (Qts: S7)

Tamala Limestone (Qtl: LS1, LS2)

Quindalup Dunes (Holocene dunes)

Safety Bay Sands (Qhs: S1, S2, LS4)

VEGETATION AND FLORA

Vegetation Complexes

Spearwood Dunes

Cottesloe Complex — North

Quindalup Dunes

Quindalup Complex

Floristic Community Types: not sampled, types not inferred

WETLANDS

No wetlands mapped

THREATENED ECOLOGICAL COMMUNITIES

Not determined

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: coastal dune, parabolic dune, blowouts

Vegetation and Flora: detailed survey (part Bushplan site — Tingay, Alan & Associates 1991c, Tingay, Alan & Associates 1992, Trudgen and Keighery 1990b), limited survey (part Bushplan site — Le Provost Environmental Consultants 1990)

Structural units: mapping (Tingay, Alan & Associates 1991c & 1992)

Spearwood Dunes

Uplands - Sands derived from Tamala Limestone: *Eucalyptus gomphocephala* Open Woodland to Woodland; *Banksia attenuata* and *B. menziesii* Low Woodland

Uplands - Tamala Limestone surfaces (come close to the coast): Open to Closed Low Heaths dominated by *Dryandra sessilis* var. *cygnorum*, *Hakea trifurcata*, *Calothamnus quadrifidus*, *Scaevola nitida*, *Acacia truncata* and *Allocasuarina humilis*; *Xanthorrhoea preissii* Shrubland

Quindalup Dunes

Older dunes and plains: Open Low Heaths of *Melaleuca acerosa*, *Acacia rostellifera*, *A. lasiocarpa* and *Hibbertia racemosa* over Herblands dominated by *Lomandra maritima*; *Acacia rostellifera* Closed Tall Scrub to Closed Heath

Younger dunes: Open to Closed Low Heaths to Shrubland dominated by *Scaevola crassifolia* and *Olearia axillaris*; *Scaevola nitida*, *Acanthocarpus preissii* and *Hemiandra pungens* or *Acacia rostellifera*

Strand: *Spinifex longifolius* and *S. hirsutus* Grassland

Scattered Native Plants: not assessed

Vegetation Condition: >60% Excellent to Very Good, <40% Very Good to Good, with areas of localised disturbance associated with previous grazing pressure (mapping, Trudgen and Keighery 1990b)

Total Flora: 147 native taxa, 36 weeds (part Bushplan Site (Ningana) — Trudgen and Keighery 1990b) (estimated >75% expected flora of Bushplan Site)

Significant Flora: Trudgen and Keighery 1990b — *Conostylis pauciflora* subsp. *euryrhipis* (3), *Stylidium maritimum* (3); *Alyogyne huegelii* subsp. *glabrescens*, *Melaleuca cardiophylla*; typical of Tamala Limestone taxa - *Grevillea preissii*, *Petrophile serruriae* subsp. nov. (GJK 11421), *Trymalium ledifolium* subsp. *ledifolium*

Fauna: limited survey by LeProvost Environmental Consultants (1990) for birds (30), native mammals (1) and reptiles (8). Significant bird species: category 3 (7) and category 4 (4)

Linkage: adjacent bushland to the north, south, and west (BS397) and east (BS288); part of proposed Greenways 1, 38 (Tingay, Alan & Associates 1997a); part of a regionally significant contiguous bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes

Meets all six specific coastal reserve criteria —

- (i) Quindalup Dune types: moderate, well separated dunes perched on gently undulating Spearwood (Tamala) Limestone surface, dunes mostly Q2 or Q3 in age; Q4 limited in area restricted to coastline, associated blowouts (Griffin and Trudgen 1994)
- (ii) Continuing natural processes: 210ha (196.2ha bushland) of Quindalup Dunes extending to 3.9kms inland
- (iii) Shoreline: sandy
- (iv) Linkage: contains Quindalup/Spearwood Dunes interface
- (v) Vegetation: typical Quindalup/Spearwood units
- (vi) Habitats: see Fauna section above;

Recommended for protection in the study of City of Wanneroo bushland (Trudgen 1996); Alkimos Dune Complex, a system of parabolic beach dunes of Holocene age containing a chronological sequence (Lemmon *et al.* 1979)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Diversity, Rarity, Maintaining ecological processes or natural systems, Criteria not relevant to determination of conservation value, but which may be applied when evaluating areas having similar values

Opportunities and/or Constraints

Opportunities: Bushplan Site/part Bushplan Site under MRS Parks and Recreation Reservation and TPS Landscape Zoning, Crown Reserve

Constraints: private land; under MRS Urban Zoning, MRD regional road requirements

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s). This may include that parts of the Bushplan Site already reserved for Parks and Recreation in the Metropolitan Region Scheme be made a National Park, Conservation Park, Nature Reserve or Regional Park.

BURNS BEACH BUSHLAND

Boundary Definition: protected area/bushland taken to cadastre boundary (Part Bushplan Site subject to further investigation in keeping with Ministerial Condition No. 487, 16 November 1998.)

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 322 **Map no.** 31 **Map sheet series ref. no.** 2034-IV SE

System 6 (1983): Part M2, part M6 area of bushland goes beyond System area boundaries, all bushland described

Other Names

South Mindarie (Semeniuk, V&C Research Group 1991a), Submission Areas 296 and 320

Local Authorities (Suburb)

Shire of Wanneroo (Burns, Mindarie), City of Joondalup (Burns)

Area (ha): total 487.8; bushland 407.9

Zoning

MRS: Rural, Parks and Recreation, Urban

TPS: Landscape, Residential Development, Marina Development Zone

Lot/Location/Reserve numbers (Purpose), Street name

1 Anchorage Dr; 2, 10489 Marmion Ave; 17, 9917, 20564 street not identified
Crown Reserve

Ownership Categories

Local Government, Private (including commercial organisation), State Government, Not identified

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Spearwood Dunes

Sands derived from Tamala Limestone (Qts: S7)

Tamala Limestone (Qtl: LS1, LS3)

Quindalup Dunes (Holocene dunes)
Safety Bay Sands (Qhs: S1, S2, LS4)

VEGETATION AND FLORA

Vegetation Complexes

Spearwood Dunes

Cottesloe Complex — Central and South

Quindalup Dunes

Quindalup Complex

Floristic Community Types

Supergroup 4: Uplands centred on Spearwood and Quindalup Dunes

24 Northern Spearwood shrublands and woodlands

28 Spearwood *Banksia attenuata* or *B. attenuata-Eucalyptus* Woodlands

29a Coastal shrublands on shallow sands

29b *Acacia* shrublands on taller dunes

S11 Northern *Acacia rostellifera* — *Melaleuca acerosa* shrublands

S13 Northern *Olearia axillaris* — *Scaevola crassifolia* shrublands

S14 *Spinifex longifolius* grassland and low shrubland

WETLANDS

No wetlands mapped

THREATENED ECOLOGICAL COMMUNITIES

Not assessed, Not determined

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: dune landforms include parabolic dunes, sand blow out and cusped foreland.

Vegetation and Flora: limited survey (Griffin 1994 (MI 01-23), part Bushplan Site — Griffin and Trudgen 1994, Keighery, GJ, 1991c, Kinhill Stearns 1983, Le Provost *et al.* 1984)

Structural Units: mapping (part Bushplan Site — Le Provost *et al.* 1984)

Spearwood Dunes

Uplands - Sands derived from Tamala Limestone: *Banksia attenuata* and *B. menziesii* Low Woodland, occasional *Eucalyptus gomphocephala* trees

Uplands - Tamala Limestone: Closed to Open Heaths dominated by *Dryandra sessilis* var. *cygnorum*, *Calothamnus quadrifidus*, *Hakea trifurcata*, *Hibbertia hypericoides* and *Melaleuca huegelii*

Quindalup Dunes

Older dunes and plains: Closed to Open Low Heaths of *Melaleuca acerosa*, *Acacia lasiocarpa*, *A. rostellifera*, *Scaevola nitens*, *Nemcia reticulata* and *Hibbertia racemosa* over Herblands dominated by *Lomandra maritima*; *Acacia rostellifera* Scrub; *Melaleuca cardiophylla* Low Forest to Closed Tall Scrub (southernmost area of this association)

Younger dunes: Heaths dominated by *Olearia axillaris*, *Scaevola nitida* and *S. crassifolia*; low dunes with Heath dominated by *Scaevola crassifolia*, *Spyridium globulosum* and *Myoporum insulare*; deflated surface poorly vegetated with *Calocephalus brownii* and *Pelargonium capitatum*, the former giving way to *Acacia cyclops* as it ages

Strand: *Spinifex longifolius* and *S. hirsutus* Grassland

Scattered Native Plants: not assessed

Vegetation Condition: >70% Excellent to Pristine, <30% Very Good to Good (Griffin and Trudgen 1994), with localised disturbance to north of Burns Beach

Total Flora: 168 native taxa, 24 weeds (Keighery, GJ, 1991c) (estimated <70% of the expected flora)

Significant Flora: *Jacksonia sericea* (3) (Keighery, GJ, 1991c), *Conostylis pauciflora* subsp. *euryrhipis* (3), *Hibbertia spicata* subsp. *leptotheca* (3), *Stylidium maritimum* (3); *Sonchus megalocarpa* (most northern record, uncommon species); *Melaleuca cardiophylla*, *Allocasuarina lehmanniana*, *Acacia xanthina*, *Lechenaultia linarioides*; *Conospermum triplinervium*; typical of Tamala Limestone taxa (Keighery, GJ, 1991c) — *Grevillea preissii*, *Diplopeltis huegelii*, *Petrophile* aff. *brevifolia* (pink flowered form), *Petrophile serruriae* subsp. nov. (GJK 11421), *Pimelea calcicola*, *Leptomeria empetriformis*, *Trymalium ledifolium* subsp. *ledifolium*

Fauna: limited faunal surveys by Kinhill Stearns (1983) for birds (54), native mammals (3), reptiles (23) and amphibians (1). Significant bird species: Scarlet Robin. Significant mammal species: Western Brush Wallaby and Honey Possum

Linkage: adjacent bushland to the south and east (BS323, across road, then through BS323 to BS383); part of proposed Greenways 1, 4 (Tingay, Alan & Associates 1997a); part of a regionally significant fragmented bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes

Meets all six specific coastal reserve criteria

- (i) Quindalup Dune types: 'South Mindarie now represents the most well defined remaining cusped foreland and its associated range of medium to small scale (Quindalup) dune landforms and vegetated habitats in this coastal sector (Whitfords to Lancelin)' (Semeniuk, V&C Research Group 1991a); 'small area of old low

dunes perched on gently undulating Spearwood (Tamala) Limestone surface; moderate sized Q3 dunes ramped on coast side; small area of Q4 dunes forming step sided closed vale; a number of small coastal blowouts with small Q4 dunes surrounding these; a major sandsheet with moderate to tall partially stabilised dune margins; bowl of sand sheet completely deflated near coast; foredune redeveloped in throat of sand sheet' and 'small area of old low dunes perched on gently undulating Spearwood (Tamala) Limestone surface with few small plains; large area of old, moderate sized dunes ramped on each other with small (if any) plains between; number of small coastal blowouts with small Q4 dunes surrounding; major sand sheet with partially stabilised dune margins; bowl of sand sheet completely deflated only near coast; foredune redeveloped in throat of sand sheet' (Griffin and Trudgen 1994)

- (ii) Continuing natural processes: 338.5ha (260.8ha bushland) of Quindalup Dunes extending to 1.4kms inland (2.8kms inland in link to BS323)
- (iii) Shoreline: sandy (soft)
- (iv) Linkage: contains Quindalup/Spearwood Dunes interface; part of semi-contiguous North-South vegetated coastal strip
- (v) Vegetation: 'vegetation is variable and typifies the range of habitat types within a cusp setting' (Semeniuk, V&C Research Group 1991a) and interfaces with Tamala Limestone surfaces and Spearwood Dunes
- (vi) Habitats: variable;

Includes core of areas recommended for conservation by Griffin and Trudgen (1994) and Semeniuk, V&C Research Group (1991a); Recommended for protection in the study of City of Wanneroo bushland (Trudgen 1996)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Diversity, Rarity, Maintaining ecological processes or natural systems, 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

Opportunities and/or Constraints

Opportunities: Bushplan Site/part Bushplan Site under MRS Parks and Recreation Reservation and TPS Landscape Zoning, Crown Reserve

Constraints: private land; under MRS Urban Zoning

Recommendation: The parts of the Bushplan Site already reserved for Parks and Recreation in the Metropolitan Region Scheme be made National Park, Conservation Park, Nature Reserve or Regional Park. The most appropriate mechanism for the protection of the remainder of this Bushplan Site to be considered through the public comment period in consultation with the land owner(s). (Note: Part Bushplan Site subject to further investigation in keeping with Ministerial Condition No. 487, 16 November 1998.)

LINK FROM BURNS BEACH BUSHLAND TO NEERABUP NATIONAL PARK

Boundary Definition: management/bushland boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 323 **Map no.** 31 **Map sheet series ref. no.** 2034-IV SE
System 6 (1983): M6 part System area bushland and part scattered native plants (canopy), all vegetation described

Other Names: not known
Local Authorities (Suburb)
 Shire of Wanneroo (Clarkson, Tamala Park)

Area (ha): total 137.6; bushland 106.1
Zoning
MRS: Rural, Important Regional Roads
TPS: Rural, Landscape
Lot/Location/Reserve numbers (Purpose), Street name
 17 Connolly Dr

Ownership Categories
 Local Government

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Spearwood Dunes
 Sands derived from Tamala Limestone (Qts: S7)
 Tamala Limestone (Qtl: LS1)
Quindalup Dunes (Holocene dunes)
 Safety Bay Sands (Qhs: LS4)

VEGETATION AND FLORA

Vegetation Complexes

Spearwood Dunes

Cottesloe Complex — Central and South

Quindalup Dunes

Quindalup Complex

Floristic Community Types: *not sampled, types inferred

Supergroup 4: Uplands centred on Spearwood and Quindalup Dunes

*24 Northern Spearwood shrublands and woodlands

*28 Spearwood *Banksia attenuata* or *B. attenuata* — *Eucalyptus* woodlands

*29b *Acacia* shrublands on taller dunes

WETLANDS

No wetlands mapped

THREATENED ECOLOGICAL COMMUNITIES

Not assessed

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: limestone ridge, tall dune, vegetated uplands

Vegetation and Flora: limited survey (Kinhill Stearns 1983)

Structural Units: mapping (Kinhill Stearns 1983)

Spearwood Dunes

Uplands - Sands derived from Tamala Limestone: *Eucalyptus tottiana*, *Banksia menziesii* and *B. attenuata* Woodland

Uplands - Tamala Limestone: *Dryandra sessilis* var. *cygnorum* Closed to Open Heaths

Quindalup Dunes

Oldest dunes and plains: *Acacia rostellifera* Tall Shrubland

Scattered Native Plants: *Eucalyptus tottiana*, *Banksia menziesii* and *B. attenuata* Woodland (Kinhill Stearns 1983)

Vegetation Condition: <30% Good to Very Good around area developed for Tamala Tip (Kinhill Stearns 1983)

Total Flora: 80 native taxa (Kinhill Stearns 1983) (estimated >50% expected flora)

Significant Flora: none recorded

Fauna: not surveyed, likely to include elements of BS383 and BS322. Significant mammal species: Quenda (Friend 1996 D)

Linkage: adjacent bushland to the south, north, east (BS383, across road) and west (BS322); part of proposed Greenway 4 (Tingay, Alan & Associates 1997a); part of a regionally significant contiguous bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes

Bushplan Site constrained in meeting the specific coastal reserve criteria; four met to a limited extent —

(i) Quindalup Dune types: oldest dunes

(ii) Continuing natural processes: 30.6ha (22.9ha bushland) of Quindalup Dunes to 2.8kms inland

(iv) Linkage: contains Quindalup/Spearwood Dunes interface

(vi) Habitats: see Fauna section above;

Part of area recommended for protection in the study of City of Wanneroo bushland (Trudgen 1996)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Rarity, Maintaining ecological processes or natural systems, Scientific or evolutionary importance

Opportunities and/or Constraints

Opportunities: Bushplan Site/part Bushplan Site under TPS Landscape Zoning

Constraints: under MRD regional road requirements

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s). This may include — 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.



COASTAL STRIP FROM BURNS BEACH TO HILLARYS

Boundary Definition: protected area/bushland (part taken to zoning) boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 325 **Map no.** 31, 37, 43 **Map sheet series ref. no.** 2034-III NE, 2034-IV SE

System 6 (1983): Part M2 area of bushland goes beyond System area boundaries, all bushland described

Other Names

includes Submission Area 29 Ocean Reef Road

Local Authorities (Suburb)

City of Joondalup (Ocean Reef, Iluka, Hillarys, Mullaloo, Kallaroo)

Ownership Categories

State Government, Local Government, Commonwealth Government, Not identified

Area (ha): total 280.1; bushland 195.0

Zoning

MRS: Parks and Recreation, Important Regional Roads, Public Purposes-Special Uses

TPS: Landscape

Lot/Location/Reserve numbers (Purpose), Street name

1028, 1029, 10969, 12803 Ocean Reef Rd; 5, 11081, 5392, 11176, 11725 West Coast Dr; 1012, 10789 Whitfords Ave; 8891 Oceanside Prom; 5392 Angove Dr; 10789 Northshore Dr; 11704 Northside Dr; 12332, 12749, 12804, 20561 street not identified
Crown Reserve

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Spearwood Dunes

Sands derived from Tamala Limestone (Qts: S7)

Tamala Limestone (Qt: LS1)

Quindalup Dunes (Holocene dunes)

Safety Bay Sands (Qhs: S1, S2)

VEGETATION AND FLORA

Vegetation Complexes

Spearwood Dunes

Cottesloe Complex — Central and South

Quindalup Dunes

Quindalup Complex

Floristic Community Types: *not sampled, types inferred

Supergroup 2: Seasonal Wetlands

*16 Highly saline seasonal wetlands

Supergroup 4: Uplands centred on Spearwood and Quindalup Dunes

27 Species poor mallees and shrublands on limestone

29a Coastal shrublands on shallow sands

*29b *Acacia* shrublands on taller dunes

*S11 Northern *Acacia rostellifera* — *Melaleuca acerosa* shrublands

*S13 Northern *Olearia axillaris* — *Scaevola crassifolia* shrublands

*S14 *Spinifex longifolius* grasslands and low shrublands

WETLANDS

No wetlands mapped

THREATENED ECOLOGICAL COMMUNITIES

Not assessed, Not determined

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: ocean — limestone cliff and coastal dune vegetation

Vegetation and Flora: limited survey (part Bushplan Site — Gibson *et al.* 1994 (Burn 01-02), Griffin 1994 (BU 01-04), Keighery, GJ, and Keighery 1992a, Semeniuk, V&C Research Group 1991a)

Structural Units

Spearwood Dunes

Uplands - Tamala Limestone: Closed to Open Low Heaths dominated by *Melaleuca cardiophylla* (southernmost large population), *M. huegelii*, *Dryandra sessilis* var. *cygnorum*, *Scaevola crassifolia*, *Spyridium globulosum* and *Templetonia retusa*; *Frankenia pauciflora* Low Shrubland (cliff edge community, relatively large area to south of Burns Beach)

Quindalup Dunes

Oldest dunes and plains (limited area, atypical as close to coast): Open Low Heaths to Shrublands dominated by *Melaleuca acerosa*, *Acacia rostellifera*, *A. xanthina* and *Olearia axillaris*

Youngest dunes: Open Low Heaths to Shrublands dominated by *Myoporum insulare*, *Scaevola crassifolia*, *Acacia rostellifera*, *A. xanthina* and *Olearia axillaris*

Strand: *Spinifex* Grassland

Scattered Native Plants: not assessed

Vegetation Condition: ranges from Excellent to Degraded, with areas of severe localised disturbance; see comments in Other Special Attributes (below)

Total Flora: 38 native taxa, 8 weeds (part Bushplan Site — Keighery, GJ, and Keighery 1992a) (estimated >60% expected flora)

Significant Flora: *Hibbertia spicata* subsp. *leptotheca* (3); *Melaleuca cardiophylla*, *Plantago exilis* (only known record in the PMR, uncommon — Keighery, GJ, and Keighery 1992a), *Alyogyne huegelii* var. *glabrescens* (Keighery, GJ, and Keighery 1992a), *Kennedia coccinea*

Fauna: no known information

Linkage: adjacent bushland to the east; part of proposed Greenways 5, 1, 11 (Tingay, Alan & Associates 1997a); part of a regionally significant fragmented bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes

Bushplan Site constrained in meeting the specific coastal reserve criteria; four met to a limited extent —

- (i) Quindalup Dune types: predominantly younger dunes
- (ii) Continuing natural processes: 214.7ha (146.1ha bushland) of Quindalup Dunes extending to maximum of 0.8km inland, dunes truncated
- (iii) Shoreline: sandy (soft) and rocky (hard); vegetated areas south of Burns Beach are the best remaining example of a 'limestone ridge forming cliffs' in the north-west corridor of the PMR (Semeniuk, V&C Research Group 1991a)
- (iv) Linkage: part of semi-contiguous North—South vegetated coastal strip;

Includes near coastal sections of areas recommended for conservation by Semeniuk, V&C Research Group (1991a)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed, Indicative Place of the Register of the National Estate

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Rarity, Maintaining ecological processes or natural systems, 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

Opportunities and/or Constraints

Opportunities: Bushplan Site/part Bushplan Site under MRS Parks and Recreation Reservation and TPS Landscape Zoning, Crown Reserve

Constraints: 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.

TRIGG BUSHLAND AND ADJACENT COASTAL RESERVE, TRIGG/SCARBOROUGH

Boundary Definition: protected area/bushland (part taken to cadastre) boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 308 **Map no.** 44, 49 **Map sheet series ref. no.** 2034-II NW, 2034-II SW
System 6 (1983): M36 area of bushland goes beyond System area boundaries, all bushland described

Other Names

Karrinyup Bushland

Local Authorities (Suburb)

City of Stirling (Trigg, Karrinyup)

Area (ha): total 178.1; bushland 134.6

Zoning

MRS: Parks and Recreation, Urban, Important Regional Roads

TPS: Landscape, Low Density Residential, Public Open Space and Local Authority Purposes

Ownership Categories

State Government, Private (commercial organisation),

Not identified

Lot/Location/Reserve numbers (Purpose),

Street name

394 Arnott St; 498, 12992 West Coast Hwy; 10, 42, 78 Elliott Rd; 9, 459, 474, 476, 472, 498 Karrinyup Rd; 43, 498, 7443 Jeanes Rd; 10 Hepworth Rd

Crown Reserve



SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Spearwood Dunes

Sands derived from Tamala Limestone (Qts: S7)

Tamala Limestone (Qtl: LS1)

Quindalup Dunes (Holocene dunes)

Safety Bay Sands (Qhs: S1, S2)

VEGETATION AND FLORA

Vegetation Complexes

Spearwood Dunes

Cottesloe Complex — Central and South

Quindalup Dunes

Quindalup Complex

Floristic Community Types

Supergroup 4: Uplands centred on Spearwood and Quindalup Dunes

- 24 Northern Spearwood shrublands and woodlands
- 28 Spearwood *Banksia attenuata* or *Banksia attenuata* — *Eucalyptus* woodlands
- 29a Coastal shrublands on shallow sands
- 29b *Acacia* shrublands on taller dunes
- S11 Northern *Acacia rostellifera* — *Melaleuca acerosa* shrublands
- S13 Northern *Olearia axillaris* — *Scaevola crassifolia* shrublands
- S14 *Spinifex longifolius* grassland and low shrubland

WETLANDS

No wetlands mapped

THREATENED ECOLOGICAL COMMUNITIES

Not assessed, Not determined

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated coastal dunes

Vegetation and Flora: detailed survey (Keighery, GJ, 1996, Meney 1991); limited survey (Gibson *et al.* 1994 (Tr 01-08), Griffin 1994 (Trig 01-06), Keighery, GJ, 1996 D (Trigg 08), Le Provost *et al.* 1988)

Structural Units: mapping (Le Provost *et al.* 1988, Meney 1991)

Spearwood Dunes

Uplands - Sands derived from Tamala Limestone: *Eucalyptus gomphocephala* Open Forest to Woodland; *Banksia attenuata* and *B. menziesii* Low Open Woodland

Uplands - Tamala Limestone: Closed Low Heaths and Closed to Open Heaths dominated by *Melaleuca acerosa*, *Calothamnus quadrifidus*, *Dryandra sessilis* var. *cygnorum*, *Acacia lasiocarpa*, *Grevillea preissii* or *Dryandra lindleyana*

Quindalup Dunes

Oldest dunes and plains: Open Heaths dominated by *Melaleuca acerosa*, *Acacia rostellifera* or *Allocasuarina lehmanniana* over Herblands dominated by *Lomandra maritima*; *Callitris preissii* Low Closed Forest; *Eucalyptus gomphocephala* Open Forest to Woodland

Youngest dunes: *Scaevola crassifolia* and *Olearia axillaris* Open Low Heaths, some scattered *Callitris preissii*

Strand: *Spinifex longifolius* Grassland

Vegetation Condition: >75% Very Good to Excellent, <25% Good to Degraded, with areas of severe localised disturbance

Total Flora: 175 native taxa (Keighery, GJ, 1996, Meney 1991) (>75 % expected flora)

Significant Flora: *Conostylis pauciflora* subsp. *euryrhipis* (3); *Lechenaultia linarioides*, *Gyrostemon ramulosus* (uncommon in PMR and on Swan Coastal Plain), *Allocasuarina lehmanniana*, *Callitris preissii* (endemic to the PMR and Rottnest Island, most northern significant population, Keighery, BJ, Gibson and Keighery 1997)

Fauna: limited surveys by Western Australian Museum of Natural Science for birds (30) and multiple and structured surveys by Western Australian Museum of Natural Science for reptiles (24) and amphibians (1) (How *et al.* 1996). Significant birds: White-browed Scrubwren, Broad-tailed Thornbill, Variegated, White-winged and Splendid fairy-wrens. Significant reptile species: Western Blue Tongue (*Tiliqua occipitalis*), Bardick (*Echiopsis curtus*), Black-striped Snake (*Simoselaps calonotos*) and dragon (*Tympanocryptis adelaidensis*). Rich assemblage and high number of reptile species

Linkage: no adjacent remnant vegetation; part of proposed Greenways 7, 8, 1 (Tingay, Alan & Associates 1997a); part of a regionally significant fragmented bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes

Meets all six specific coastal reserve criteria —

- (i) Quindalup Dune types: 'landscape moderate to tall, moderate dunes perched on gently undulating Spearwood (Tamala) limestone surface, with plain between; low coastal Q4 dunes (youngest)' (Griffin and Trudgen 1994)
- (ii) Continuing natural processes: 124.8ha (104ha bushland) of Quindalup Dunes extending to 2.2km inland
- (iii) Shoreline: sandy (soft)
- (iv) Linkage: contains Quindalup/Spearwood Dunes interface; roads and developments fragment Bushplan Site; part of semi-contiguous North—South vegetated coastal strip
- (v) Vegetation: typical Quindalup/Spearwood units, highly restricted species (*Callitris preissii*)
- (vi) Habitats: rich assemblage and high number of reptile species;

National Trust of Australia (WA) Classification

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Listed on the Register of the National Estate

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, 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

Opportunities and/or Constraints

Opportunities: Bushplan Site/part Bushplan Site under MRS Parks and Recreation Reservation and TPS Landscape Zoning and Public Open Space Zoning, Crown Reserve

Constraints: private land; under MRS Urban Zoning, 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.

FLOREAT BEACH BUSHLAND, CITY BEACH/SCARBOROUGH

Boundary Definition: protected area/bushland taken to cadastre 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. 310 **Map no. 49** **Map sheet series ref. no. 2034-II SW**

Other Names: not known

Area (ha): total 111.5; bushland 51.7

Local Authorities (Suburb)

Zoning

Town of Cambridge (City Beach), City of Stirling (Scarborough)

MRS: Urban, Parks and Recreation, Important Regional Roads

TPS: Landscape, Parks and Recreation

Ownership Categories

Lot/Location/Reserve numbers (Purpose),

State Government, Local Government, Not identified

Street name

1, 1911, 2246 West Coast Hwy; 1911 The Boulevard
Crown Reserve

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Spearwood Dunes

Tamala Limestone (Qtl: LS1)

Quindalup Dunes (Holocene dunes)

Safety Bay Sands (Qhs: S1, S2)

VEGETATION AND FLORA

Vegetation Complexes

Spearwood Dunes

Cottesloe Complex — Central and South

Quindalup Dunes

Quindalup Complex

Floristic Community Types: *not sampled, types inferred

*29b *Acacia* shrublands on taller dunes

*S13 Northern *Olearia axillaris* — *Scaevola crassifolia* shrublands

*S14 *Spinifex longifolius* grassland and low shrubland

WETLANDS

No wetlands mapped

THREATENED ECOLOGICAL COMMUNITIES

Not assessed, Not determined

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated uplands

Vegetation and Flora

Structural Units

Quindalup Dunes

Youngest dunes: Open Low Heaths dominated by *Scaevola crassifolia*, *Olearia axillaris*, *Acacia rostellifera*, *A. lasiocarpa* and combinations of these

Strand: *Spinifex longifolius* Grassland

Scattered Native Plants: not assessed

Vegetation Condition: Very Good (Connell 1995)

Total Flora: not known

Significant Flora: none recorded

Fauna: no known information

Linkage: adjacent bushland to the south; part of proposed Greenway 1 (Tingay, Alan & Associates 1997a); part of a regionally significant fragmented bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes

Bushplan Site constrained in meeting the specific coastal reserve criteria; four met to a limited extent —

- (i) Quindalup Dune types: younger dunes
- (ii) Continuing natural processes: 107.7ha (49.3ha bushland) of Quindalup Dunes extending to 1km (0.9km bushland) inland, dunes mostly truncated
- (iii) Shoreline: sandy (soft)
- (iv) Linkage: part of semi-contiguous North—South vegetated coastal strip

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, 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

Opportunities and/or Constraints

Opportunities: Bushplan Site/part Bushplan Site under MRS Parks and Recreation Reservation, TPS Landscape Zoning and Parks and Recreation Zoning, Crown Reserve

Constraints: under MRS Urban Zoning, 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.

SWANBOURNE BUSHLAND, SWANBOURNE/CITY BEACH

Boundary Definition: protected area/bushland boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 315 **Map no. 55** **Map sheet series ref. no. 2034-II SW**
System 6 (1983): M46 area of bushland goes beyond System area boundaries, all bushland described

Other Names: not known

Local Authorities (Suburb)

City of Nedlands (Swanbourne, Mt Claremont), Town of Cambridge (City Beach, Mt Claremont)

Area (ha): total 221.6; bushland 174.9

Zoning

MRS: Urban, Parks and Recreation, Parks and Recreation Restricted, Public Purposes-Commonwealth, Other Major Highways, Important Regional Roads, Public Purposes-Water Authority of WA
TPS: Landscape, Recreation, Parks and Recreation



Ownership Categories

Commonwealth Government, State Government, Local Government, Private (commercial organisation)

Lot/Location/Reserve numbers (Purpose), Street name

2, 715, 1911 Rochdale Rd; 2 McClemans Rd; 0, 1, 5, 314, 337, 340, 359 Wood St; 1, 356 Alfred Rd; 1, 204, 205, 280, 328, 357, 361 Marine Pde; 0 street not identified

Crown Reserve

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Spearwood Dunes

Tamala Limestone (Qtl: LS1)

Quindalup Dunes (Holocene dunes)

Safety Bay Sands (Qhs: S1, S2)

VEGETATION AND FLORA

Vegetation Complexes

Spearwood Dunes

Karrakatta Complex — Central and South

Cottesloe Complex — Central and South

Quindalup Dunes

Quindalup Complex

Floristic Community Types

Supergroup 4: Uplands centred on Spearwood and Quindalup Dunes

29b *Acacia* shrublands on taller dunes

S11 Northern *Acacia rostellifera* — *Melaleuca acerosa* shrublands

S13 Northern *Olearia axillaris* — *Scaevola crassifolia* shrublands

S14 *Spinifex longifolius* grassland and low shrubland

WETLANDS

No wetlands mapped

THREATENED ECOLOGICAL COMMUNITIES

Not assessed, Not determined

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: coastal dunes

Vegetation and Flora: detailed survey (part Bushplan Site — Keighery, GJ, and Keighery 1993c, Mitchell McCotter and Ecoscape 1993); limited survey (Dames and Moore 1986, Griffin 1994 (SW 01-11), Keighery, GJ, 1996 D (M46 01-02))

Structural Units: mapping (part Bushplan Site — Mitchell McCotter and Ecoscape 1993)

Spearwood Dunes

Uplands - Sands derived from Tamala Limestone and Tamala Limestone: limited in area and vegetation; reflects Quindalup Dunes floristic influence

Quindalup Dunes

Oldest dunes and plains (limited area): *Eucalyptus gomphocephala* Woodland; *Callitris preissii* Low Closed Forest (R. Powell pers. comm.); Open Low Heaths dominated by *Melaleuca acerosa*, *Acacia rostellifera*, *A. lasiocarpa*, *Calothamnus quadrifidus* over Herblands dominated by *Lomandra maritima*; *Allocasuarina lehmanniana* subsp. *lehmanniana* Closed Tall Scrub; *Acacia rostellifera* Closed Tall Scrub

Youngest dunes: Open Low Heaths to Closed Tall Scrub dominated by *Myoporum insulare*, *Scaevola crassifolia*, *Acacia rostellifera*, *Olearia axillaris*

Strand: *Spinifex hirsutus* Grassland

Vegetation Condition: >75% Very Good to Excellent, <25% Good to Degraded

Total Flora: 117 native taxa, 58 weeds (Keighery, GJ, and Keighery 1993c) (estimated >75% expected flora)

Significant Flora: *Lechenaultia linarioides*, *Allocasuarina lehmanniana* (most southern significant population), *Chamelaucium uncinatum* (with Bold Park most southern population), *Callitris preissii* (R. Powell pers. comm.)

Fauna: multiple and structured surveys by Western Australian Museum of Natural Science for birds (57), native mammals (1) and reptiles (19) (How *et al.* 1996). Significant populations of insectivorous passerine birds including Splendid, Variegated and White-winged fairy-wrens and White-browed Scrubwren. Significant bird species: category 1 (1), category 3 (8) and category 4 (5). Significant reptile species: Bardick (*Echiopsis curtus*)

Linkage: adjacent bushland to the north (BS312); part of proposed Greenways 1, 19 (Tingay, Alan & Associates 1997a); part of a regionally significant fragmented bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes

Meets all six specific coastal reserve criteria —

- (i) Quindalup Dune types: 'moderate to tall, moderate aged dunes perched on gently undulating Spearwood (Tamala) Limestone surface, with little plain between them; moderate sized coastal Q4 (youngest) dunes' (Griffin and Trudgen 1994)
- (ii) Continuing natural processes: 220.3ha (174.8ha bushland) of Quindalup Dunes extending to 1.6km inland
- (iii) Shoreline: sandy (soft)
- (iv) Linkage: adjacent to area containing Quindalup/Spearwood Dunes interface; part of semi-contiguous North—South vegetated coastal strip
- (v) Vegetation: four regional floristic groups, diversity of structural groups
- (vi) Habitats: see Fauna section above

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Rarity, Maintaining ecological processes or natural systems, 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 location of Scheduled Fauna; under MRS Parks and Recreation Reservation, Parks and Recreation Restricted Zoning, TPS Parks and Recreation Zoning, Landscape Zoning and Recreation Zoning, Crown Reserve

Constraints: under MRS Urban Zoning, MRD regional road requirements

Recommendation: The existing care, control and management intent of the reserved area (MRS Parks and Recreation) is endorsed. Long-term security and support for conservation management of the Bushplan Site be enhanced by: amending the purpose of the reserve to include conservation; and applying appropriate mechanisms in consultation with the reserve management body. For the remaining land managed by the Defence Department: The most appropriate mechanism for the protection of this Bushplan Site to be considered through the public comment period in consultation with the land owner(s).

WOODMAN POINT, COOGEE/MUNSTER

Boundary Definition: protected area/bushland taken to cadastre 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. 341 **Map no.** 66, 72, 73 **Map sheet series ref. no.** 2033-I NW, 2033-I SW, 2033-IV SE

System 6 (1983): M90 part System area bushland, only bushland described

Other Names: not known

Local Authorities (Suburb)

City of Cockburn (Coogee, Munster)

Ownership Categories

State Government, Local Government, Not identified

Area (ha): total 247.2; bushland 91.7

Zoning

MRS: Parks and Recreation, Railways

TPS: Landscape

Lot/Location/Reserve numbers (Purpose),

Street name

50, 51, 52, 55, 57, 61, 139, 144, 145, 154, 184, 185
Cockburn Rd; 52, 59, 149, 181, 182, 183 Woodman
Point View; 178, 180 O'Kane Ct; 140 Powell Rd; 50,
51, 52, 53, 54, 56, 58, 179, 2682, 11430 street not
identified

Crown Reserve

Reserve 42469 (Conservation of Flora and Fauna)

CALM Managed Land

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Spearwood Dunes

Tamala Limestone (Qtz: LS1)

Quindalup Dunes (Holocene dunes)

Safety Bay Sands (Qhs: S13)



VEGETATION AND FLORA

Vegetation Complexes

Spearwood Dunes

Cottesloe Complex — Central and South

Quindalup Dunes

Quindalup Complex

Floristic Community Types: *not sampled, types inferred

Supergroup 4: Uplands centred on Spearwood and Quindalup Dunes

*30a2 *Callitris preissii* and/or *Melaleuca lanceolata* forests and woodlands (DEP 1996, re-allocated from 30a, equivalent to 30a in Gibson *et al.* 1994, English and Blyth 1997)

30c2 Woodlands and shrublands on Holocene dunes

WETLANDS

No wetlands mapped

THREATENED ECOLOGICAL COMMUNITIES

Vulnerable (floristic community type 30a as defined by Gibson *et al.* 1994)

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated coastal peninsula

Vegetation and Flora: detailed survey (Fox and Majer 1981, Powell and Emberson 1981); limited survey (Gibson *et al.* 1994 (Wood 01-02))

Structural Units: mapping (Powell and Emberson 1991)

Spearwood Dunes

Uplands - Tamala Limestone : mixed Open Heath

Quindalup Dunes

Beach ridge plain: *Eucalyptus gomphocephala* Open Forest; *Callitris preissii* Low Closed Forest; *Spyridium globulosum* and *Acacia rostellifera* Tall Open Scrub

Strand: *Spinifex hirsutus* and *S. longifolius* Grassland

Scattered Native Plants: not assessed

Vegetation Condition: >75% Excellent to Good, <25% Degraded to Good, with areas of severe localised disturbance associated with the explosives enclosures

Total Flora: 87 native taxa, 40 weeds (Powell and Emberson 1991) (estimated >80% expected flora, GJ Keighery pers. comm.)

Significant Flora: *Dodonaea hackettiana* (4), *Callitris preissii* (large population, some mature individuals)

Fauna: multiple and structured surveys by Western Australian Museum of Natural Science and RAOU (1996 D), 16 visits, for birds (92), native mammals (1), reptiles (14) and amphibians (1) (How *et al.* 1996). Significant populations of insectivorous passerine birds including Splendid Fairy-wren, Grey Shrike-thrush, Golden Whistler, and White-browed Scrubwren. Significant bird species: category 1 (1), category 2 (15), category 3 (9) and category 4 (6). Significant mammal species: Quenda (Friend 1996 D). Significant reptile species: Lined Skink (*Lerista lineata*)

Linkage: adjacent bushland to the east; part of proposed Greenways 1, 109 (Tingay, Alan & Associates 1997a); part of a regionally significant contiguous bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes

Meets five of the six specific coastal reserve criteria —

(i) Quindalup Dune types: beach ridge plain

(ii) Continuing natural processes: 232.3ha (90.3ha bushland) of Quindalup Dunes extending to 1.3km (1.6km bushland) inland

(iii) Shoreline: sandy (soft)

(v) Vegetation: two regional floristic groups; mature trees of *Eucalyptus gomphocephala*, *Acacia rostellifera*, *Melaleuca huegelii* and *Callitris preissii*; one of two areas with significant *Callitris preissii* Low Closed Forest (Keighery, BJ, Gibson and Keighery 1997)

(vi) Habitats: see Fauna section above;

majority of Bushplan Site included in Woodman Point Regional Park proposal (State Government Cabinet Minute, 5 May 1997)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed; Indicative Place on Register of the National Estate; Location for JAMBA/CAMBA species

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Rarity, 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

Opportunities and/or Constraints

Opportunities: Bushplan Site/part Bushplan Site location of Scheduled Fauna; under MRS Parks and Recreation Reservation and TPS Landscape Zoning, Crown Reserve



Recommendation: The care, control and management of this Bushplan Site (including Reserve 42469) for conservation purposes within Woodman Point Regional Park is endorsed.

CARNAC ISLAND

Boundary Definition: management taken to coastline boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 473 **Map no.** 65, 71 **Map sheet series ref. no.** 2033-IV NE

System 6 (1983): C46 part System area bushland, all bushland described

Other Names: not known **Area (ha):** total 19.6; bushland 19.6

Local Authorities (Suburb)

Zoning

City of Cockburn (Carnac Island)

MRS: Waterways

TPS: Landscape

Ownership Categories

Lot/Location/Reserve numbers (Purpose),

State Government

Street name

CALM Managed Land

2001

Reserve 26646 (Recreation and Conservation of Fauna)

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Spearwood Dunes

Sands derived from Tamala Limestone (Qts: S7)

Tamala Limestone (Qtl: LS1)

VEGETATION AND FLORA

Vegetation Complexes

Quindalup Dunes

Quindalup Complex

Floristic Community Types: *not sampled, types inferred

Supergroup 2: Seasonal Wetlands

*16 Highly saline seasonal wetlands

Supergroup 4: Uplands centred on Spearwood and Quindalup Dunes

*29a Coastal shrublands on shallow sands

WETLANDS

No wetlands mapped

THREATENED ECOLOGICAL COMMUNITIES

Not assessed

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: ocean — limestone cliff, limestone flats, vegetated uplands

Vegetation and Flora: limited survey (McArthur 1990)

Structural Units: mapping (McArthur 1990)

Spearwood Dunes

Uplands - Tamala Limestone: *Acacia rostellifera* and *Olearia axillaris* Open Heath; Open to Closed Low Heath dominated by *Olearia axillaris* and *Scaevola crassifolia*; *Rhagodia baccata*, *Olearia axillaris* and *Calocephalus brownii* and *Nitraria billardierei*; *Frankenia pauciflora* Open Low Heath

Quindalup Dunes

Strand: *Carpobrotus virescens*, *Tetragonia sp.* and *Suaeda australis* Herbland

Vegetation Condition: Very Good to Excellent

Total Flora: not known

Significant Flora: none recorded

Fauna: limited survey by I. Abbott (1977) for birds (12). Significant bird species: category 2 (1)

Linkage: no adjacent bushland

Other Special Attributes

Specific coastal reserve criteria not applied to small islands

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Listed on the Register of the National Estate; Location for JAMBA/CAMBA species

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, 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



Opportunities and/or Constraints

Opportunities: Bushplan Site/part Bushplan Site under TPS Landscape Zoning, Crown Reserve

Recommendation: The existing purpose, care, control and management of Reserve 26646 is endorsed.

GARDEN ISLAND

Boundary Definition: management/bushland boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 63 **Map no.** 71, 78, 79 **Map sheet series ref. no.** 2033-IV SW

System 6 (1983): M96 part System area bushland, only bushland described

Other Names: not known

Area (ha): total 1120.5; bushland 956.9

Local Authorities (Suburb)

Zoning

City of Rockingham (Garden Island)

MRS: Public Purposes-Commonwealth Government, Public Purposes-Special Uses, Waterways

TPS: Landscape

Ownership Categories

Lot/Location/Reserve numbers (Purpose),

Commonwealth Government, State Government

Street name

9, 696

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Spearwood Dunes

Sands derived from Tamala Limestone (Qts: S7)

Tamala Limestone (Qtl: LS1)

Quindalup Dunes (Holocene dunes)

Safety Bay Sands (Qhs: S1, S2, S13)

VEGETATION AND FLORA

Vegetation Complexes

Quindalup Dunes

Quindalup Complex

Floristic Community Types: *not sampled, types inferred

Supergroup 4: Uplands centred on Spearwood and Quindalup Dunes

29a Coastal shrublands on shallow sands

*29b *Acacia* shrublands on taller dunes

30a2 *Callitris preissii* and/or *Melaleuca lanceolata* forests and woodlands (DEP 1996, re-allocated from 30a, equivalent to 30a in Gibson *et al.* 1994, English and Blyth 1997)

30c2 Woodlands and shrublands on Holocene dunes

*S13 Northern *Olearia axillaris* — *Scaevola crassifolia* shrublands

*S14 *Spinifex longifolius* grassland and low shrubland

WETLANDS

No wetlands mapped

THREATENED ECOLOGICAL COMMUNITIES

Not assessed, Vulnerable (floristic community type 30a as defined by Gibson *et al.* 1994), Not determined

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: island, ocean — limestone cliff

Vegetation and Flora: detailed survey (Keighery, GJ, 1998, McArthur 1957, McArthur 1990, McArthur and Bartle 1981, Marchant and Abbot 1991); limited survey (Gibson *et al.* 1994 (Gard 01-04)); synopsis (Keighery, BJ, Gibson and Keighery 1997)

Structural Units: mapping (McArthur 1957, McArthur 1990, McArthur and Bartle 1981)

Spearwood Dunes

Uplands - Tamala Limestone with shallow Quindalup sands: Closed Low Heath dominated by combinations of *Scaevola crassifolia*, *Acrotriche cordata*, *Boronia alata* and *Alyxia buxifolia*

Quindalup Dunes

Youngest dunes: Low Forest to Low Open Forest dominated by *Callitris preissii*, *Melaleuca lanceolata*, *Melaleuca huegelii*, *Acacia rostellifera* and combinations of these; Closed Tall Scrub dominated by *Acacia rostellifera*, *Spyridium globulosum*, *Pittosporum phylliraeoides*, *Melaleuca huegelii*, *Beyeria viscosa*, *Diplolaena dampieri* and combinations of these

Strand: *Spyridium globulosum*, *Alyxia buxifolia*, *Olearia axillaris* and *Calocephalus brownii* Open Heath; *Sarcocornia blackiana* Low Shrubland; *Cakile maritima*, *Salsola kali* and *Carpobrotus virescens* Open Low Heath; *Lepidosperma gladiatum* and *Isolepis nodosa* Sedgeland

Vegetation Condition: >80% Excellent to Pristine, <20% Very Good to Good, with areas of severe localised disturbance

Total Flora: 105 native taxa, 78 weeds (Keighery, BJ, Gibson and Keighery 1997, Keighery, GJ, 1998, McArthur 1957, Marchant and Abbot 1981) (estimated >90% expected flora)

Significant Flora: Keighery, BJ, Gibson and Keighery 1997 — *Lepidium puberulum* (4) (only record on the Plain south of Lancelin), *Melaleuca lanceolata* (only population in PMR, disjunct from Margaret River), *Callitris preissii* (endemic to the PMR, most extensive populations), *Amyema melaleucae* (a mistletoe growing on *Melaleuca lanceolata*, disjunct south from Dongara and the only record on the Swan Coastal Plain), *Lasiopetalum angustifolium* (previously *L. oppositifolium*, disjunct south from Green Head and the only record on the Swan Coastal Plain), *Boronia alata* (disjunct north from Cape Naturaliste, also recorded from two other locations in the Perth area — Rottnest Island and Minim Cove), *Myosotis australis*, disjunct from Margaret River (only record on the Swan Coastal Plain), *Pittosporum phylliraeoides* (significant populations of a species that is very uncommon on the Swan Coastal Plain) and *Trachymene coerulea*

Fauna: multiple and structured surveys for birds (94) (Brooker *et al.* 1995a), native mammals (1) (Brooker *et al.* 1995b) and reptiles (14) (Robinson *et al.* 1987 and Brooker *et al.* 1995a). Significant bird species: category 2 (14), category 3 (5) and category 4 (5). Significant island populations of Tammar Wallaby, Carpet Python (*Morelia spilota*), Lined Skink (*Lerista lineata*), Brush Bronzewing and Golden Whistler

Linkage: no adjacent bushland

Other Special Attributes

Meets five of the six specific criteria for coastal reserves:

- (i) Quindalup Dune types: deep and shallow dunes and thin sands overlaying Tamala Limestone
- (ii) Continuing natural processes: 1019.9ha (865.5ha bushland) of Quindalup Dunes; almost completely vegetated island
- (iii) Shoreline: sandy (soft) and rocky (hard)
- (v) Vegetation: six regional floristic groupings, one confined to Woodman Point and Garden Island
- (vi) Habitats: see Fauna section above

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Register of the National Estate; Location for JAMBA/CAMBA species

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Rarity, Maintaining ecological processes or natural systems, 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 location of Scheduled Fauna, under TPS Landscape Zoning

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.

POINT PERON AND ADJACENT BUSHLAND, PERON/SHOALWATER BAY

Boundary Definition: protected area/management taken to coastline 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. 355 **Map no.** 85, 86 **Map sheet series ref. no.** 2033-III NE

Other Names: not known

Area (ha): total 189.3; bushland 107.1

Local Authorities (Suburb)

Zoning

City of Rockingham (Peron)

MRS: Parks and Recreation, Public Purposes-Special Uses, Waterways, Important Regional Roads

TPS: Landscape

Ownership Categories

Lot/Location/Reserve numbers (Purpose),

State Government

Street name

2056, 2057, 2059, 2152, 2193, 2238, 2600, 2642, 2732, 2733, 2734 Point Peron Rd; 2600; 4357 Safety Bay Rd

Crown Reserve

CALM Managed Land

Marine Reserve 5 (Marine Park)



SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Spearwood Dunes

Tamala Limestone (Qtl: LS1)

Quindalup Dunes (Holocene dunes)

Safety Bay Sands (Qhs: S1, S2, S13)

Lagoonal and Estuarine Deposits (within the Quindalup Dunes)

Lagoonal and Estuarine Deposits (Vasse) (Qhg: M5)

VEGETATION AND FLORA

Vegetation Complexes

Quindalup Dunes

Quindalup Complex

Floristic Community Types: *not sampled, types inferred

Supergroup 2: Seasonal Wetlands

*16 Highly saline seasonal wetlands

Supergroup 4: Uplands centred on Spearwood and Quindalup Dunes

*29a Coastal shrublands on shallow sands

*29b *Acacia* shrublands on taller dunes

*S13 Northern *Olearia axillaris* — *Scaevola crassifolia* shrublands

*S14 *Spinifex longifolius* grasslands and low shrublands

WETLANDS

Wetland Types: artificial channel

Natural Wetland Groups

Quindalup

Becher (Qu.2)

Wetland Management Objectives: not assessed

Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Not assessed, Not determined

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: ocean — limestone cliff, vegetated uplands

Vegetation and Flora: detailed survey (Keating and Trudgen 1986)

Structural Units: mapping (Keating and Trudgen 1986)

Spearwood Dunes

Uplands - Tamala Limestones: *Frankenia pauciflora* and *Sarcocornia blackiana* Low Open Shrubland; Open Heaths dominated by *Templetonia retusa* and *Melaleuca huegelii*

Quindalup Dunes

Youngest dunes: Shrublands dominated by *Acacia rostellifera* and *Jacksonia furcellata* sometimes with *Leucopogon parviflorus* or *A. rostellifera* and *Calothamnus quadrifidus*; Closed Heaths to Shrublands dominated by *Acacia rostellifera*, *Olearia axillaris* or *Alyxia buxifolia* and combinations of these; Closed to Open Scrub dominated by *Acacia rostellifera* and *Melaleuca huegelii* or *Acacia rostellifera* and *Olearia axillaris*

Strand: *Spinifex longifolius* Open Grassland

Scattered Native Plants: not assessed

Vegetation Condition: >50% Very Good to Good, <50% Degraded, with areas of severe localised disturbance

Total Flora: 69 native taxa (Keating and Trudgen 1986, excluding obvious wetland taxa of BS358) (estimated >60% expected flora)

Significant Flora: none identified

Fauna: limited survey by WA Naturalists' Club (pers. comm.) for reptiles (16). Significant reptile species: Carpet Python (*Morelia spilota*) and Lined Skink (*Lerista lineata*)

Linkage: adjacent bushland to the east (BS358, across road); part of proposed Greenways 1, 106, 109 (Tingay, Alan & Associates 1997a)

Other Special Attributes

Meets six specific coastal reserve criteria —

- (i) Quindalup Dune types: youngest, older and beach ridge plain
- (ii) Continuing natural processes: 174.5ha (106.1ha bushland) of Quindalup Dunes extending to 3.1km inland from the point
- (iii) Shoreline: sandy (soft) and rocky (hard)
- (iv) Linkage: contains Quindalup/Spearwood Dunes (Tamala Limestone) interface; roads and developments fragment Bushplan Site
- (v) Vegetation: typical Quindalup/Spearwood units



(vi) Habitats: see Fauna section above;
 Isolated rocky headland displaying excellent exposures of the aeolian phase of Tamala Limestone, connected to the mainland by a series of Holocene beach-sand and dune-sand ridges of the Safety Bay Sands. Raised and submerged sea erosional terraces and beach deposits along the foreshore are thought to indicate past still-stands of sea level at 3, 1.5 and 0.6 metres above present sea level during the Holocene and this evidence has been used for world-wide eustatic correlations (Lemmon *et al.* 1979); majority of Bushplan Site included in Port Kennedy and Rockingham Parks proposal (Tingay, Alan & Associates 1997b, WA Cabinet Minute 5, May 1997)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Rarity, 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

Opportunities and/or Constraints

Opportunities: Bushplan Site/part Bushplan Site location of Scheduled Fauna; under MRS Parks and Recreation Reservation and TPS Landscape Zoning, Crown Reserve

Constraints: under MRD regional road requirements

Recommendation: The care, control and management of this Bushplan Site for conservation purposes within Rockingham Lakes Regional Park is endorsed.

LAKE RICHMOND, ROCKINGHAM

Boundary Definition: protected area/bushland (part taken to cadastre) boundary (part eastern boundary subject to Ministerial Condition No. 486, 18 September 1998)

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 358 **Map no.** 86 **Map sheet series ref. no.** 2033-III NE

System 6 (1983): M102 part System area bushland, only bushland described

Other Names: not known

Area (ha): total 80.0 (includes open water); bushland 28.7

Local Authorities (Suburb)

Zoning

City of Rockingham (Rockingham, Peron, Shoalwater)

MRS: Parks and Recreation, Urban, Important Regional Roads

TPS: Landscape, Local Roads, No Zone, Residential Special

Ownership Categories

Lot/Location/Reserve numbers (Purpose), Street name

State Government, Private (commercial organisation)

3 Richmond Ave; 402 Broughton Wy; 1530, 1597 Lake St; 1596, 1598 Fisher St; 17 Safety Bay Rd; 18 street not identified

Crown Reserve

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Quindalup Dunes (Holocene dunes)

Safety Bay Sands (Qhs: S13)

Lagoonal and Estuarine Deposits (within the Quindalup)

Lagoonal and Estuarine Deposits (Vasse) (Qhg: M5)

VEGETATION AND FLORA

Vegetation Complexes

Quindalup Dunes

Quindalup Complex

Floristic Community Types

Supergroup 2: Seasonal Wetlands

19a Sedgeland in Holocene dune swales (DEP 1996, equivalent to 19 in Gibson *et al.* 1994, English and Blyth 1997)

Supergroup 4: Uplands centred on Spearwood and Quindalup Dunes

29a Coastal shrublands on shallow sands

WETLANDS

Wetland Types: lake, artificial channel, damplands/sumplands (includes wetlands not previously described, Bowman Bishaw Gorham 1997a&b, DEP 1998)

Natural Wetland Groups

Quindalup

Cooloongup (Qu.1)

Becher (Qu.2)

Wetland Management Objectives: Conservation (54.8ha)

Swan Coastal Plain Lakes EPP: 53.3ha

THREATENED ECOLOGICAL COMMUNITIES

Not assessed, Critically Endangered (floristic community type 19 (as defined by Gibson *et al.* 1994), Stromatalite-like community of coastal freshwater lakes)

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: open water, vegetated wetlands

Vegetation and Flora: detailed survey (Keating and Trudgen 1986, part Bushplan Site - Bowman Bishaw Gorham 1997a&b); limited survey (DEP 1996 (Rich 01-02), DEP 1998)

Structural Units: mapping (Keating and Trudgen 1986; part Bushplan Site - Bowman Bishaw Gorham 1997a&b)

Quindalup Dunes

Uplands: *Acacia rostellifera*, *Leucopogon parviflorus* and *Jacksonia furcellata* Shrubland; *Olearia axillaris* Shrubland; *Acacia saligna* and *Jacksonia furcellata* Shrubland; *Lomandra maritima* Herbland

Wetlands: *Melaleuca raphiophylla* Low Woodland to Low Forest; Shrubland dominated by *Acacia saligna* or *Xanthorrhoea preissii* and combinations of these; Closed Sedgeland dominated by *Juncus pallidus*, *J. kraussii*, *Isolepis nodosus*, *Lepidosperma gladiatum*, *Typha ?domingensis* and *Baumea juncea* and combinations of some of these; Sedgeland dominated by *Gahnia trifida* or *Isolepis nodosa*

Scattered Native Plants: *Melaleuca huegelii* Shrubland; areas with scattered native species

Vegetation Condition: >50% Very Good to Excellent, <50% Good to Degraded, with areas of severe localised disturbance

Total Flora: 61 native taxa, 24 exotics (Bowman Bishaw Gorham 1997a&b, DEP 1996, Keating and Trudgen 1986) (estimated >65% expected flora)

Significant Flora: none identified

Fauna: surveyed by RAOU (1996 D), one visit, WA Naturalists' Club and Tingay, Alan & Associates (1997b) for birds (100). Significant bird species: category 2 (1) and category 4 (1). Limited survey by Tingay, Alan & Associates (1997b) for native mammals, reptiles, amphibians (5) and fish (several)

Linkage: adjacent bushland/scattered native plants to the east and west (BS355, across road); part of proposed Greenways 106, 99 (Tingay, Alan & Associates 1997a)

Other Special Attributes

Meets five of the six specific coastal reserve criteria —

- (i) Quindalup Dune types: beach ridge plain
- (ii) Continuing natural processes: 21.9ha (15.5ha bushland) of Quindalup Dunes extending to 1.7kms inland
- (iv) Linkage: links to coast through BS355
- (v) Vegetation: wetland and upland units; rare communities
- (vi) Habitats: see Fauna section above;

Wetland of 'regional significance' (Semeniuk, V&C Research Group 1991b); contains examples of microbialites, organo-sedimentary structures formed by microorganisms, the oldest life-form on earth (Tingay, Alan & Associates 1997b); majority of Bushplan Site included in Port Kennedy and Rockingham Parks proposal (Tingay, Alan & Associates 1997b)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Listed on the Register of the National Estate; Location for JAMBA/CAMBA species

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, 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 Coastal Plain Lakes EPP; location of conservation category wetlands; under MRS Parks and Recreation Reservation and TPS Landscape Zoning, Crown Reserve

Constraints: private land; under MRS Urban Zoning, MRD regional road requirements

Recommendation: The care, control and management of this Bushplan Site for conservation purposes within Rockingham Lakes Regional Park is endorsed. (Note: Part eastern boundary subject to Ministerial Condition No. 486, 18 September 1998.)



PENGUIN, SEAL, BIRD AND GULL ISLANDS AND SHAG ROCK

Boundary Definition: Penguin Island - bushland taken to cadastre boundary; other islands not mapped

SECTION 1: CADASTRAL INFORMATION

(only applies to Penguin Island)

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

Bushplan Site no. 367 Map no. 86 Map sheet series ref. no. 2033-III NE System 6 (1983): M101 part System area bushland, only bushland described

Other Names: not known

Area (ha): total 14.6; bushland 6.1

Local Authorities (Suburb)

Zoning

Shire of Rockingham (Penguin Island)

MRS: Parks and Recreation, Waterways

Other islands not mapped

TPS: Landscape

Ownership Categories

Lot/Location/Reserve numbers (Purpose),

State Government

Street name

17070

CALM Managed Land

Reserve 24204 (Conservation of Flora and Fauna), 17070 (Recreation camping enjoyment by public for holidays thereon and for purposes ancillary thereto)

SECTION 2: REGIONAL INFORMATION

(only applies to Penguin Island)

LANDFORMS AND SOILS

Spearwood Dunes

Tamala Limestone (Qtl: LS1)

Quindalup Dunes (Holocene dunes)

Safety Bay Sands (Qhs: S2, S13)

VEGETATION AND FLORA

Vegetation Complexes

Quindalup Dunes

Quindalup Complex

Floristic Community Types: not sampled, types not inferred

WETLANDS

No wetlands mapped

THREATENED ECOLOGICAL COMMUNITIES

Not determined

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: island, vegetated uplands

Vegetation and Flora: detailed survey (Chape 1984, CALM 1992, Storr 1961)

Penguin Island

Structural Units: mapping (Chape 1984, CALM 1992)

Spearwood Dunes - Tamala Limestones: Low Open Shrublands dominated by *Carpobrotus virescens* and *Frankenia pauciflora* or *Rhagodia baccata*; *Nitraria billardierei* Shrubland

Quindalup Dunes

Youngest Dunes: Shrublands to Closed Heath dominated by *Olearia axillaris* and *Scaevola crassifolia*, by *Abyxia buxifolia* and *Scaevola crassifolia* or by *Acacia rostellifera*

Strand: *Spinifex longifolius* and *S. hirsutus* Grassland

Total Flora: 46 native taxa, 27 weeds (Storr 1961) (estimated >85% expected flora)

Significant Flora: none recorded

Seal Island

Structural Units

Spearwood Dunes - Tamala Limestones: Low Open Shrublands dominated by *Carpobrotus virescens* and *Frankenia pauciflora* or *Rhagodia baccata*

Quindalup Dunes - Strand: *Spinifex longifolius* Grassland

Total Flora: 18 native taxa, 14 weeds (Storr 1961) (estimated >85% expected flora)

Significant Flora: none recorded

Gull Island

Structural Units

Spearwood Dunes - Tamala Limestones: *Nitraria billardierei* Shrubland

Total Flora: 2 native taxa (Storr 1961) (estimated >85% expected flora)

Significant Flora: none recorded



Bird Island

Structural Units

Spearwood Dunes - Tamala Limestones: *Nitraria billardi* Shrubland; *Lavatera plebeia* var. *tomentosa* Low Shrubland

Total Flora: 18 native taxa, 13 weeds (Storr 1961) (estimated >85% expected flora)

Significant Flora: *Lavatera plebeia* var. *tomentosa* (virtually restricted to offshore Islands — Keighery, GJ, 1990a).

Shag Rock

Structural Units

Spearwood Dunes - Tamala Limestones: *Nitraria billardi* Shrubland; *Lavatera plebeia* var. *tomentosa* Low Shrubland

Total Flora: West Shag Rock — 6 native taxa; East Shag Rock — 4 native taxa (Storr 1961) (estimated >85% expected flora)

Significant Flora: *Lavatera plebeia* var. *tomentosa* (virtually restricted to offshore Islands — Keighery, GJ, 1990a).

Vegetation Condition: >75% Very Good, <25% Good to Degraded, with areas of severe localised disturbance

Fauna: multiple surveys by Abbott (1977) and RAOU (1996 D), 4 visits, for birds (50), by CALM (1992a) for native mammals (2) and Costa (1977) for reptiles (6). Important breeding site for 14 bird species including Little Penguin and 11 other seabirds and important habitat for at least five JAMBA/CAMBA species. Significant bird species: category 2 (5) and category 3 (1). Significant breeding population of Bridled Tern. Significant mammal species: Australian Sea-lion

Linkage: no adjacent bushland

Other Special Attributes

Specific coastal reserve criteria not applied to small islands

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Listed on the Register of the National Estate; Location for JAMBA/CAMBA species

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Maintaining ecological processes or natural systems, 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 location of Scheduled Fauna; under MRS Parks and Recreation Reservation and TPS Landscape Zoning, Crown Reserve

Recommendation: The existing purpose, care, control and management of Reserves 17070 and 24204 is endorsed.

LAKE COOLOONGUP, LAKE WALYUNGUP AND ADJACENT BUSHLAND, HILLMAN TO PORT KENNEDY

Boundary Definition: protected area/bushland (part taken to cadastre) boundary (Areas of bushland within the boundaries of the Bushplan Site are not accurately mapped.)

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 356 **Map no.** 87, 93, 99 **Map sheet series ref. no.** 2033-II NW, 2033-II SW
System 6 (1983): M103 area of bushland goes beyond System area boundaries, all bushland described

Other Names: not known

Area (ha): total 2727.6 (includes open water); bushland 1604.1

Local Authorities (Suburb)

Shire of Rockingham (Hillman, Coo loongup, Waikiki, Warnbro, Port Kennedy, Baldivis)

Zoning

MRS: Urban, Parks and Recreation, Rural, Public Purposes—Special Uses, Railways, Controlled Access Highways, Other Major Highways, Important Regional Roads, Public Purposes—Water Authority Of WA
TPS: Landscape, Public Open Space, Local Roads, Rural



Ownership Categories

State Government, Private (including commercial organisation)

Lot/Location/Reserve numbers (Purpose),

Street name

0, 11 Day Rd; 11, 19, 20, 21, 317, 318, 319, 320, 327, 333, 334, 336, 338, 342, 583, 658, 757, 765, 766, 767, 785, 1114, 1126, 1286, 1287, 1331, 1387 Mandurah Rd; 328, 461, 1127, 1276 Safety Bay Rd; 2285, 2730 Elanora Dr; 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 22, 4097 Dixon Rd; 451 Timberlane Loop; 321, 322, 636, 637, 638, 639, 640, 1309, 1310, 1329, 1330, 1332 Eighty Rd; 14, 314, 315, 316 Fifty Rd; 1, 2 Baldivis Rd; 542 Saltaire Wy; 2, 581, 582 Warnbro Sound Ave; 766, 768, 771, 796 Forty Rd; 1300 Stakehill Rd; 1, 19, 461 Ennis Ave; 1 Port Kennedy Dr; 0, 26, 1001 street not identified
 Crown Reserve

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Bassendean Dunes

Bassendean Sands (Qpb: S8)

Spearwood Dunes

Sands derived from Tamala Limestone (Qts: S7)

Tamala Limestone (Qtl: LS1)

Quindalup Dunes (Holocene dunes)

Safety Bay Sands (Qhs: S13, LS4)

Wetlands (within the Spearwood/Bassendean Dunes)

Holocene Swamp Deposits (Qhw: Cps, Cs1)

Lagoonal and Estuarine Deposits (within the Spearwood/Bassendean Dunes)

Lagoonal and Estuarine Deposits (Vasse) (Qhg: M5)

VEGETATION AND FLORA

Vegetation Complexes

Spearwood Dunes

Karrakatta Complex — Central and South

Cottesloe Complex — Central and South

Quindalup Dunes

Quindalup Complex

Floristic Community Types: *not sampled, type inferred

Supergroup 2: Seasonal Wetlands

17 *Melaleuca raphiophylla* — *Gahnia trifida* seasonal wetlands

19b Woodlands over sedgeland in Holocene dune swales (DEP 1996, equivalent to 19 in Gibson *et al.* 1994, English and Blyth 1997)

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau

21a Central *Banksia attenuata* — *Eucalyptus marginata* woodlands

Supergroup 4: Uplands centred on Spearwood and Quindalup Dunes

24 Northern Spearwood shrublands and woodlands (most southerly occurrence)

*29b *Acacia* shrublands on taller dunes

WETLANDS

Wetland Types: lake, sumpland, dampland, artificial lake

Natural Wetland Groups

Spearwood Dunes

Stakehill (S.4)

Quindalup

Cooloongup (Qu.1)

Becher (Qu.2)

Wetland Management Objectives: Conservation (1462.3ha)

Swan Coastal Plain Lakes EPP: 312.8ha + 24.2ha + 438.6ha + 48.8 = 824.4ha (total)

THREATENED ECOLOGICAL COMMUNITIES

Not assessed, Critically Endangered (floristic community type 19 as defined by Gibson *et al.* 1994)

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: open water, vegetated wetlands, vegetated uplands

Vegetation and Flora: detailed survey (part Bushplan Site — Keighery, BJ, *et al.* 1997c, Tingay and Tingay 1977); limited survey (EPA and WAWA 1990, Gibson *et al.* 1994 (Tam 01, Cool 01-04, 08-09, 11, Kero 01-02), Keighery, GJ, 1996 D (Cool 14-15))

Structural Units: mapping (part Bushplan Site — EPA and WAWA 1990, Keighery, BJ, *et al.* 1997c, Tingay and Tingay 1977)

Spearwood Dunes

Sands derived from Tamala Limestone: *Banksia attenuata* and *B. menziesii* Low Woodland; *Eucalyptus gomphocephala*, *E. marginata* and *Banksia attenuata* Open Forest; *Grevillea vestita* Closed Heath; *Hibbertia hypericoides* Open Low Heath

Quindalup Dunes

Beach ridge plain: *Eucalyptus gomphocephala* Woodland to Forest; *Acacia rostellifera* Tall Open Scrub; *Jacksonia furcellata* and *Acacia rostellifera* Shrubland; *Acacia saligna* Low Open Woodland to Low Woodland; *Xanthorrhoea preissii* Open Heath

Wetlands (at or near the interface of the Quindalup and Spearwood Dunes): Open to Closed Sedgelands dominated by *Baumea juncea*, *Gahnia trifida*, *Lepidosperma longitudinale*, *Juncus kraussii* or *Baumea vaginalis* or combinations of these; *Banksia littoralis* Low Woodland; *Melaleuca raphiophylla* Low Woodland to Forest; *Eucalyptus gomphocephala* Woodland to Forest

Scattered Native Plants: *Eucalyptus gomphocephala* Woodland; *Acacia saligna* Low Woodland; *Xanthorrhoea preissii* Open Heath

Vegetation Condition: >60% Very Good to Pristine, <40% Good to Degraded, with areas of severe localised disturbance

Total Flora: 174 native taxa, 82 exotics (part Bushplan Site — Keighery, BJ, *et al.* 1997c) (>85% of expected flora)

Significant Flora: Keighery, BJ, *et al.* 1997c — *Trachymene coerulea*, *T. pilosa* (distinct form found also at Rottnest Island), *Sonchus hydrophilus* (at risk), *Atriplex suberecta* (not previously recorded on the Swan Coastal Plain), *Linum marginale* (rarely recorded on Quindalup dunes), *Acacia pulchella* var. *goadbyi* (only known occurrence on the Swan Coastal Plain), *Eremophila glabra* subsp. *albicans*, *Jacksonia furcellata* (floriferous shrub form), *Kennedia coccinea* (becoming increasingly uncommon on the western margins of the Plain)

Fauna: surveyed by RAOU (1996 D), 3 visits, and by A & SR Tingay (1977) for birds (73). Significant bird species: category 2 (6), category 3 (10), category 4 (5). Significant population of Black Swan. Limited survey by A & SR Tingay (1977) for native mammals (2), reptiles (1), amphibians (3) and fish (1). Significant mammal species: Western Brush Wallaby and Quenda (Friend 1996 D)

Linkage: adjacent bushland to the north (BS349, across road), south, east and west (BS377); part of proposed Greenways 98, 102, 138, 99 (Tingay, Alan & Associates 1997a); part of a regionally significant contiguous bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes

Meets five of the six specific criteria for coastal reserves—

- (i) Quindalup Dune types: beach ridge plain and older dunes
- (ii) Continuing natural processes: 1079.4ha (837.4 bushland) of Quindalup Dunes extending to 8.8km inland (through Bushplan Site 377 to coast)
- (iv) Linkage: Quindalup/Spearwood Dunes (Tamala Limestone) interface
- (v) Vegetation: five regional floristic groups, one of which is a threatened community
- (vi) Habitats: see Fauna section above;

Part Bushplan Site (Lake Cooloongup and Lake Walyungup) — wetland of 'national significance'; part Bushplan Site (Tamworth Lakes) — wetland of 'regional significance' (Semeniuk, V&C Research Group 1991b); contains examples of microbialites, organo-sedimentary structures formed by microorganisms, the oldest life-form on earth (Tingay, Alan & Associates 1997b); majority of Bushplan Site included in Port Kennedy and Rockingham Parks proposal (Tingay, Alan & Associates 1997b)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Listed on the Register of the National Estate; Location for JAMBA/CAMBA species

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Diversity, Rarity, Maintaining ecological processes or natural systems, 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 Peel-Harvey Estuary EPP/SPP, Swan Coastal Plain Lakes EPP; location of conservation category wetlands; under MRS Parks and Recreation Reservation and TPS Landscape Zoning and Public Open Space Zoning, Crown Reserve

Constraints: private land; under MRS Urban Zoning, MRD regional road requirements, Priority and General Mineral Resource Area (limestone), mining tenements M70/556 and M70/558

Recommendation: The care, control and management of this Bushplan Site for conservation purposes within Rockingham Lakes Regional Park is endorsed.



PORT KENNEDY

Boundary Definition: protected area/bushland (part taken to cadastre) 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. 377 **Map no. 92, 98, 99** **Map sheet series ref. no. 2033-II SW, 2033-III NE, 2033-III SE**

System 6 (1983): Part M106 area of bushland goes beyond System area boundaries, only bushland described

Other Names

Becher Point Wetlands

Local Authorities (Suburb)

City of Rockingham (Port Kennedy, Secret Harbour)

Ownership Categories

State Government

CALM Managed Land

Area (ha): total 785.2; bushland 674.9

Zoning

MRS: Urban, Parks and Recreation, Waterways, Public Purposes-Special Uses

TPS: Development Zone, Landscape, Ocean

Lot/Location/Reserve numbers (Purpose),

Street name

132, 133 Forty Rd; 138, 213, 1377 street not identified

Crown Reserve

Nature Reserve 44077 (Conservation of Flora and Fauna),

45041 (Conservation of Flora and Fauna)

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Quindalup Dunes (Holocene dunes)

Safety Bay Sands (Qhs: S2, S13)

Wetlands (within the Quindalup)

Holocene Swamp Deposits (Qhw: Cps)

VEGETATION AND FLORA

Vegetation Complexes

Quindalup Dunes

Quindalup Complex

Floristic Community Types: *not sampled, types inferred

Supergroup 2: Seasonal Wetlands

19a Sedgeland in Holocene dune swales (DEP 1996, equivalent to 19 in Gibson *et al.* 1994, English and Blyth 1997)

Supergroup 4: Uplands centred on Spearwood and Quindalup Dunes

29b *Acacia* shrublands on taller dunes

*S13 Northern *Olearia axillaris* — *Scaevola crassifolia* shrublands

*S14 *Spinifex longifolius* grassland and low shrubland

WETLANDS

Wetland Types: dampland, sumpland

Natural Wetland Groups

Quindalup

Cooloongup (Qu.1)

Becher (Qu.2)

Peelhurst (Qu.3)

Wetland Management Objectives: Conservation (19.5ha)

Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Not assessed, Critically Endangered (floristic community type 19 as defined by Gibson *et al.* 1994), Not determined

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: coastal dunes

Vegetation and Flora: detailed survey (Keighery, GJ, and Keighery 1993c; part Bushplan Site — Trudgen 1989); limited survey (Gibson *et al.* 1994 (PB 01-06))

Structural Units: mapping (part Bushplan Site — Trudgen 1989)

Quindalup Dunes

Uplands - Beach ridge plain: *Olearia axillaris* Open Shrubland to Closed Heath to Closed Tall Scrub; *Scaevola crassifolia* and *Olearia axillaris* Low Open heath to Closed Heath to Open Scrub; Open Heath to Open Low Heaths dominated by *Acacia rostellifera*, *A. lasiocarpa* var. *lasiocarpa*, *Melaleuca acerosa*, *Olearia axillaris*, *Jacksonia furcellata* and combinations of these over *Austrostipa flavescens* Grassland



Wetlands - Beach ridge plain: *Juncus kraussii* Closed Sedgeland, at times over *Sarcocornia quinqueflora* Closed Herbland; *Isolepis nodosa* and *Baumea juncea* Closed to Open Sedgeland, generally with an overstorey of *Xanthorrhoea preissii*

Strand: *Spinifex longifolius* Grassland

Scattered Native Plants: not assessed

Vegetation Condition: >60% Very Good to Pristine, <40% Good to Degraded, with areas of severe localised disturbance

Total Flora: 172 native taxa, 68 weeds (Keighery, GJ, and Keighery 1993c) (estimated >90% expected flora)

Significant Flora: (Keighery, GJ, and Keighery 1993c): *Cryptandra mutila* and *Zygophyllum fruticosum* (southern range end), *Diplolaena dampieri* and *Hibbertia cuneiformis* (northern range end); *Jacksonia furcellata* (floriferous shrub form)

Fauna: limited survey by Binnie & Partners (1988) and Tingay, Alan & Associates (1997a) for birds (22), native mammals (5), reptiles (7) and amphibians (3). Significant mammal species: Western Brush Wallaby and Quenda

Linkage: adjacent bushland to the north, south and east (BS356); part of proposed Greenways 1, 98 (Tingay, Alan, & Associates 1997a); part of a regionally significant fragmented bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes

Meets all six of the specific criteria for coastal reserves —

- (i) Quindalup Dune types: beach ridge plain
- (ii) Continuing natural processes: 764.2ha (657.9ha bushland) of Quindalup Dunes extending to 4km inland
- (iii) Shoreline: sandy (soft)
- (iv) Linkage: through adjacent BS356 to Spearwood Dunes
- (v) Vegetation: two regional floristic groups, one of which is a threatened community, areas of vegetation in apparently Pristine condition
- (vi) Habitats: see Fauna section above;

Part Bushplan Site recommended to be declared an A-class Nature Reserve for the protection of flora and fauna in Gibson *et al.* 1994; wetlands of 'national and international significance' (Semeniuk, V&C Research Group 1991b); majority of Bushplan Site included in Port Kennedy and Rockingham Parks proposal (Tingay, Alan & Associates 1997b)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Directory of Important Wetlands in Australia; Listed on the Register of the National Estate

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Diversity, Rarity, Maintaining ecological processes or natural systems, 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 location of conservation category wetlands; under MRS Parks and Recreation Reservation and TPS Landscape Zoning, Crown Reserve

Constraints: under MRS Urban zoning

Recommendation: The care, control and management of this Bushplan Site (Reserves 44077, 45041) for conservation purposes within Port Kennedy and Rockingham Lakes Regional Park is endorsed.





Part B
BUSHPLAN SITES

2.6 ESTUARIES, RIVERS AND CREEKS

Part B

2.6 ESTUARIES, RIVERS AND CREEKS

2.6.1 INTRODUCTION

Location, Landscape and Soils

A number of Bushplan Sites have been identified along the estuaries, rivers and creeks of the Swan Coastal Plain in the Perth Metropolitan Region, namely those associated with:

- the Swan and Canning Estuaries
- the Swan, Helena, Canning, Serpentine and Southern Rivers
- Bennett Brook.

Where a creek was closely aligned with upland regionally significant bushland, sections of the creek, or the entire creek, are grouped as a Bushplan Site and the description located with the appropriate major landform element group. Bushplan Site 2 is an example, along the Ellen Brook.

In some instances the entire course of the estuary, river or creek has not been mapped within the boundaries of a Bushplan Site as there was no bushland mapped for certain sections of the river or creek. This is a product of the selection process and these unmapped areas should be considered regionally significant as part of important linkages (see Volume 2, Map 8 and Volume 2, Part A, section 4.4.5).

Collectively, the estuaries, rivers and creeks on the Swan Coastal Plain in the Perth Metropolitan Region cross all of the major landform elements. Associated landforms range through steep Tamala Limestone cliffs of the Swan Estuary, sandy bars and flats, and waterlogged alluvial flats.

The soils associated with these estuaries, rivers and creeks range from mud and sand overlaying quartz sand to sand overlaying Tamala Limestone cliffs, alluvium of quartz sand and clay, quartz sands and, along the Serpentine River, iron-indurated hardpans (Table 2.6). In addition the soils of the estuaries are influenced by saline and/or freshwater inundation and/or waterlogging while the rivers and creeks are predominantly fresh but are increasingly subject to salinity.

Remnant Vegetation along Estuaries, Rivers and Creeks

Vegetation associated with estuaries, rivers and creeks is typically highly cleared. The presence of relatively fertile soils and fresh water from the river or creek or shallow wells adjacent to transport corridors made these areas the first focus for agriculture. In addition many of the wet flats have been drained and filled for agriculture, playing fields and roads. Between one per cent and 11 per cent of the native vegetation in the vegetation complexes associated with these areas remains (Table 3.6).

Plant Communities and their Conservation along Estuaries, Rivers and Creeks

At the regional level four vegetation complexes (Table 3.6) have been identified as being associated with the estuaries, rivers and creeks.


In general, estuarine and riverine vegetation was not systematically sampled in the Gibson *et al.* (1994) study — it was not possible to cover fully this vegetation in the time available and it was considered that these restricted habitat types had been documented elsewhere (Pen 1993, Siemon *et al.* 1993). The System 6 Update work sampled a few locations in these habitats but, again, this was not done systematically. As a consequence, while floristic community types have been identified in specific bushland areas, the units broadly associated with this vegetation have not been determined. Two of the floristic community types associated with the creeks that traverse the Foothills, floristic community types 3a and 3c, and another, floristic community type 30a (after Gibson *et al.* 1994), associated with the Swan Estuary are threatened ecological communities.

A variety of vegetation associations has been identified on the slopes and wetflats along estuaries, rivers and creeks. These are best dealt with under each of the wetland types.

Estuaries

Wetflats

The main vegetation associations on the wetflats are forest to woodland, shrublands and sedgelands.



While the estuarine margins are typically saline, freshwater seepages result in the local occurrence of freshwater communities. These broad units and associated dominant species are:

Forests and Woodlands

Eucalypts — *Eucalyptus rudis*
Sheoaks — *Casuarina obesa*
Melaleucas — *Melaleuca raphiophylla*, *M. cuticularis*

Shrublands

Melaleuca viminea, *Halosarcia* species, *Sarcocornia* species

Sedgelands

Baumea juncea, *Bolboschoenus caldwellii*,
Schoenoplectus validus, *Gahnia trifida*, *Leptocarpus*,
Juncus kraussii, *J. pallidus*

Slopes

The main vegetation associations on the slopes are low woodlands and shrublands, dominated by species typical of the Quindalup and/or Spearwood Dunes (Keighery, GJ, and Keighery 1998). The broad units and associated dominant species are:

Woodlands

Eucalypts — *Eucalyptus gomphocephala*
Banksias — *Banksia attenuata*, *B. menziesii*
Sheoaks — *Allocasuarina fraseriana*
Others — *Callitris preissii*

Shrublands (dominant and other taxa)

Acacia lasiocarpa var. *lasiocarpa*, *A. truncata*, *A. xanthina*, *Acanthocarpus preissii*, *Adriana quadripartita*, *Alyxia buxifolia*, *Anthocercis littorea*, *Comesperma integerrima*, *Dodonaea aptera*, *Dryandra sessilis* var. *cygnorum*, *Grevillea vestita*, *Melaleuca huegelii*, *Pittosporum phylliraeoides* var. *phylliraeoides*, *Scaevola nitida*, *Spyridium globulosum*, *Templetonia retusa*

Herblands

Conostylis candicans

Many of these taxa are typical of the Muehea Limestone communities and it is possible that the estuaries formed a corridor for the migration of elements of the Spearwood/Quindalup flora to the eastern side of the Swan Coastal Plain (Keighery, GJ, and Keighery 1998).

Rivers

The main vegetation associations on the river banks and flats are forest to woodland, shrublands and sedgelands. These broad units and associated dominant species are:

Forests and Woodlands

Eucalypts — *Eucalyptus rudis*
Sheoaks — *Casuarina obesa* (occasional)
Melaleucas — *Melaleuca raphiophylla*
Others — *Acacia saligna*

Shrublands

Melaleuca viminea, *Astartea* aff. *fascicularis*, *Acacia dentifera*, *Agonis linearifolia*

Herblands

Centella cordifolia

Sedgelands

Baumea juncea, *B. articulata*, *Carex fascicularis*,
Lepidosperma tetraquetrum, *L. effusum*, *Juncus pallidus*.

Grasslands

Hemarthria uncinata

Creeks

The vegetation associated with creeks may be similar to that described for rivers or their adjacent communities when the creek is traversing the Pinjarra Plain or Foothills. Creeks of the Pinjarra Plain and Foothills are generally dominated by *Eucalyptus calophylla* and/or *E. wandoo*.

Typically, vegetation associated with estuaries, rivers and creeks is in narrow bands which are rarely intact, generally being in a degraded condition, usually backed by roads, grazed land and recreation land or housing. Intact estuarine, riverine and creekline vegetation (that is, good or better condition) is a rare occurrence on the Swan Coastal Plain. The small intact patches are all that remain of the complex wetland system that was once associated with the watercourses. Species such as *Parsonia diaphanophleba* (only found at Lowlands – Bushplan Site 368 in the Perth Metropolitan Region), *Acacia dentifera* and *A. paradoxa*, which are only known on the Swan Coastal Plain from riverine communities, indicate that other species, and perhaps communities, may once have occurred on the estuaries and watercourses.

Part B

Table 2.6: Natural Wetland Groups (Consanguineous Suites) of Estuaries, Rivers and Creeks (after Semeniuk, 1996)

Name & locations	Geomorphic setting	Primary wetlands	Stratigraphy	Origin of wetlands
Creeks				
Ellen Brook suite (R3) Ellen Brook area	Pinjarra Plain	Creek, floodplain river	Clays & sandy clays overlying laterite & sandstones	Fluvial incision; sedimentation; surface runoff
Bennett Brook suite (B/P4) 1. Ballajura: In Bennett Brook area west of West Swan 2. Balannup: In Southern River area north of Forrestdale Lake 3. Yangedi: In Serpentine River area west of Serpentine township	Bassendean Dune – with microscale creeks	Sumplands creeks palusplains floodplains	Quartz sands, or clay overlying quartz sand	Depressions which intersect the water table. Precipitation is ponded by clay lenses in the sub-surface. Palusplains are situated between tributaries
Rivers and Estuaries				
Swan River Estuary suite (E2) Swan River area between Fremantle & Guildford	Traversing 3 dune units: Quindalup, Spearwood & Bassendean; flooded basins extend north & south of Swan River channel along depressions between Spearwood dune ridges & Bassendean Dunes.	Estuary	Mud & sand overlying quartz sand & limestone	Marine-inundated river valley which was receiving basin for Canning, Helena & Swan Rivers
Swan River suite (R2) Swan River, Helena River, Canning River, Serpentine River	Traversing the Swan Coastal Plain; incised channel alternatives with braided shallow channel, terraces & large point bar deposits	River floodplain	Alluvium of quartz sand & clay	Fluvial incision; sedimentation; surface runoff
Goegrup suite (R4) Serpentine River section north of Peel Inlet to Karnup	Contact depression between Spearwood Dunes Unit & Bassendean Dunes Unit – along which Serpentine River meanders	River, floodplains, palusplains, creeks	Quartz sand with iron indurated hardpans	Fluvial incision; sedimentation; river has been impounded & water flow reduced

Table 3.6: Vegetation complexes (Heddle et al., 1980) and percentage remaining as native vegetation (AgWA, 1998 GIS) of Estuaries, Rivers and Creeks in the Perth Metropolitan Region

Vegetation Complex	Native Vegetation (%)
SERPENTINE RIVER COMPLEX: Closed scrub of <i>Melaleuca</i> species and fringing woodland of <i>Eucalyptus rudis</i> – <i>Melaleuca raphiophylla</i> along streams.	9
SWAN COMPLEX: Fringing woodland of <i>Eucalyptus rudis</i> – <i>Melaleuca raphiophylla</i> with localised occurrence of low open forest of <i>Casuarina obesa</i> and <i>M. cuticularis</i>	11
VASSE COMPLEX: Mixture of the closed scrub of <i>Melaleuca</i> species fringing woodland of <i>Eucalyptus rudis</i> – <i>Melaleuca</i> species and open forest of <i>E. gomphocephala</i> – <i>E. marginata</i> – <i>E. calophylla</i>	1
CANNINGTON COMPLEX: Mosaic of vegetation from adjacent vegetation complexes of Bassendean, Karrakatta, Southern River and Vasse.	1

ESTUARIES, RIVERS AND CREEKS

2.6.2 DESCRIPTIONS

Bushplan Site No.	Bushplan Map No.	System 6	Bushplan Site Name	Page No.
296	36		Ellen Brook, Upper Swan	369
302	42, 47, 48, 52	M19 M20	Swan River and Jane Brook, Ashfield to Upper Swan	370
215	53, 54	M33	Helena River, Helena Valley	372
305	47, 52	M41	Bennett Brook, Eden Hill to West Swan	373
491	52	M44	Swan River Backwater, South Guildford	375
214	52		Ashfield Flats, Bassendean/Ashfield	376
313	51, 57	M51	Swan River Saltmarshes, Bayswater/Maylands	377
314	51, 57	M50	Swan River Foreshore, Mount Lawley/Maylands	378
402	56	M62	Pelican Point, Crawley	380
221	60	M59	Point Resolution Reserve, Dalkeith	381
403	55, 60	M54	Peppermint Grove Foreshore	382
334	60	M56 M61	Chidley Point and Adjacent Bushland, Mosman Park	384
335	60	M57	Minim Cove, Mosman Park	385
490	60	M71	Cantonment Hill, Fremantle	386
331	60, 61	M58	Blackwall Reach, Point Walter, Alfred Cove and Adjacent Bushland, Bicton to Applecross	387
329	61	M65	Point Heathcote Foreshore, Applecross	390
338	61	M74	Yagan Wetland and Adjacent Bushland, Rossmoyne to Bull Creek	391
227	61	M66	Mount Henry Bushland, Salter Point	393
333	61, 62	M67	Canning River Foreshore, Salter Point to Wilson	394
224	62, 63	M68 M75	Canning River Regional Park and Adjacent Bushland, Riverton to Langford	395
246	63, 69, 70	M75	Canning and Southern Rivers, Beckenham to Martin/Kelmscott	398
255	69	M75	Dallen Road Bushland, Southern River/Gosnells	399
260	69		Southern River and Adjoining Bushland, Westfield	400
266	76, 83, 84		Wungong Brook, Byford	401
371	95, 96	M105	Serpentine River, Peel Estate to Serpentine	403
394	99, 100, 103, 104	M108	Lake Amarillo, Serpentine River and Adjacent Bushland, Karnup	404

ELLEN BROOK, UPPER SWAN

Boundary Definition: bushland/conservation wetland boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 296 Map no. 36 Map sheet series ref. no. 2134-IV SW
Other Names: not known Area (ha): total 57.2; bushland 44.1

Local Authorities (Suburb)
Shire of Swan (Bullsbrook)

Zoning
MRS: Rural, Other Major Highways, Public Purposes-Commonwealth
TPS: General Rural, Landscape
Lot/Location/Reserve numbers (Purpose), Street name
(Creekline and riverine lots not identified)
158 Warren Rd; 1 street not identified
Crown Reserve

Ownership Categories

Private (including commercial organisation), State Government, Local Government, Commonwealth Government, Not identified

SECTION 2: REGIONAL INFORMATION

Pinjarra Plain

Guildford Formation (Qpa: Mgs1, S11)

VEGETATION AND FLORA

Vegetation Complexes

Pinjarra Plain

Guildford Complex

Beermullah Complex

Floristic Community Types: not sampled, types not inferred

Supergroup 1 - Foothills/Pinjarra Plain

Supergroup 2 - Seasonal Wetlands

WETLANDS

Wetland Types: palusplain, river, creek, artificial channel

Natural Wetland Groups (undefined areas included in boundary)

Swan Coastal Plain Rivers

Ellen Brook (R.3)

Wetland Management Objectives: Conservation (45.4ha), Multiple Use

Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Not determined

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: open water, vegetated wetland, creek

Vegetation and Flora: limited survey (Connell 1995, DEP 1996, 1998)

Structural Units/Scattered Native Plants

Wetlands (river banks and wetflats): Eucalyptus rudis Open Forest to Woodland over/or Melaleuca raphiophylla

Low Open Forest to Low Woodland

Vegetation Condition: varies from a few patches in Excellent Condition with an understorey of sedges and shrubs to Completely Degraded with a pasture/weed understorey

Significant Flora: none recorded

Fauna: no known information

Linkage: bushland canopy linkage to the north (BS294), south (BS301) and west; part of proposed Greenway 50 (Tingay, Alan & Associates 1997a); part of a regionally significant contiguous bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: naturally vegetated watercourses have particular conservation value in providing habitat for fauna and linkage between larger more intact areas of bushland; contains a channel (Ellen Brook) recommended for conservation by Semeniuk, V&C Research Group (1992); contains 7706m of regionally significant river (WRC 1996a GIS)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Maintaining ecological processes or natural systems, 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

Opportunities and/or Constraints

Opportunities: Bushplan Site/part Bushplan Site subject to Swan and Canning Rivers EPP; location of conservation category wetlands; under TPS Landscape Zoning, Crown Reserve

Constraints: private land; under MRD regional road requirements, General Mineral Resource Area (clay)

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s).

SWAN RIVER AND JANE BROOK, ASHFIELD TO UPPER SWAN

Boundary Definition: protected area/bushland (part taken to cadastre)/conservation wetland boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 302 Map no. 42, 47, 48, 52 Map sheet series ref. no. 2034-II NE, 2034-II SE, 2134-III NW

System 6 (1983): Part M19 and part M20 part System area bushland and part scattered native plants (canopy), all vegetation described

Other Names: not known

Area (ha): total 259.4(includes open water); bushland 227.3

Local Authorities (Suburb)

Shire of Swan (Herne Hill, Middle Swan, Henley Brook, West Swan, Millendon, Baskerville, Belhus, Upper Swan, Midland, Caversham, Brigadoon, Viveash

Zoning

MRS: Urban, Industrial, Rural, Waterways, Parks and Recreation, Railways, Controlled Access Highways, Public Purposes-High School

TPS: Caravan Park, General Industrial, General Rural, Landscape, Local Road, Place of Public Assembly, Public Purposes, Recreation, Residential 1, Special Purpose, Swan Valley Rural

Ownership Categories

Private (including commercial organisation), Local Government, State Government, Not identified

Lot/Location/Reserve numbers (Purpose), Street name

(Creekline and riverine lots not identified)
1, 68, 69 Great Northern Hwy; 39 West Swan Rd; 59, 63, 64, River Rd; 97 Barrett St; 1, 3, 4, 30 Swan Rd; 1 Railway Ave; 14 Noack Rd; 43, 1007 Cathedral Ave; 81, 7526 Crosbie Rd; 1, 13, 69, 150, 216 Middle Swan Rd; 8181, 12133 Bernley Dr; 1 Toodyay Rd; 1, 2, 26 Ferguson St; 1, 50 Harris Rd; 2 Caversham Ave; 1007 Copley Rd; 17 street not identified
Crown Reserve

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Pinjarra Plain

Guildford Formation (Qpa: Mgs1) (Qha: Mc1, Cm2)

Bassendean Dunes

Bassendean Sands (Qpb: S8)

VEGETATION AND FLORA

Vegetation Complex

Pinjarra Plain

Guildford Complex

Swan Complex

Floristic Community Types: not sampled, types not inferred.

WETLANDS

Wetland Types: sumpland, floodplain, palusplain, river, creek, artificial channel

Natural Wetland Groups

Darling Plateau

Walyunga (D.1)

Swan Coastal Plain Rivers

Swan River (R.2)

Wetland Management Objectives: Conservation (83.3ha, 4818m), Resource Enhancement, Multiple Use

Swan Coastal Plain Lakes EPP: 2.7 ha

THREATENED ECOLOGICAL COMMUNITIES

Not determined



SECTION 3: SPECIFIC SITE DETAIL

Jane Brook (from junction with Swan River eastward)

Landscape Features: open water, vegetated wetland

Vegetation and Flora: limited survey (Ecoscape 1995a)

Structural Units: mapping (Ecoscape 1995a)

Wetlands (river banks and flats): Eucalyptus calophylla and E. wandoo occasional E. marginata Open Forest to Low Woodland; Astartea aff. fascicularis, Trymalium ledifolium and Acacia pulchella Shrubland to Low Shrubland; Eucalyptus rudis and Melaleuca raphiophylla Open Forest to Low Open Forest

Scattered Native Plants: Woodlands to Forests dominated by Eucalyptus calophylla, E. rudis less commonly and other scattered native shrubs

Vegetation Condition: Very Good to Good (Ecoscape 1995a)

Total Flora: 20 native taxa, 45 weeds (Ecoscape 1995a) (estimated >85% expected flora)

Significant Flora: none recorded

Fauna: no systematic survey. Opportunistic records (Ecoscape 1995) of birds (24), native mammals (2), reptiles (3) and amphibians (1). Significant mammal species: Quenda (Friend 1996 D)

Other Special Attributes: National Trust of Australia (WA) Classification; naturally vegetated watercourses have particular conservation value in providing habitat for fauna and linkage between larger more intact areas of bushland; contains open space of regional significance (DCE 1983); contains part of the channel (Jane Brook) recommended for conservation by Semeniuk, V&C Research Group (1992)

Swan River (West Swan Road to Upper Swan) and Susannah Brook (to Railway Parade)

Landscape Features: vegetated wetland

Vegetation and Flora: limited survey (Chambers and Pen 1985, Connell 1995)

Structural Units: mapping (Chambers and Pen 1985, Connell 1995)

Wetlands (wetflats): Eucalyptus rudis and Melaleuca raphiophylla Open Forest to Low Woodland over Juncus pallidus, Centella cordifolia, *Paspalum distichum, *P. dilatatum, *Typha orientalis, *Aster subulatus and combinations of these; Casuarina obesa and Melaleuca raphiophylla Low Open Forest to Low Open Woodland; Eucalyptus rudis Woodland; Closed to Very Open Sedgeland containing Juncus kraussii, Bolboschoenus caldwellii, Schoenoplectus validus and combinations of these

Scattered Native Plants: Eucalyptus rudis Woodland

Vegetation Condition: Good (Connell 1995)

Total Flora: not known

Significant Flora: none recorded

Fauna: no known information

Other Special Attributes: National Trust of Australia (WA) Classification; One of few outcrops of the Guildford Formation, a sequence of conglomerate, grit, sandstone and clay deposited throughout most of the Pleistocene as alluvial fans (Lemmon et al. 1979); naturally vegetated watercourses have particular conservation value in providing habitat for fauna and linkage between larger more intact areas of bushland; contains open space of regional significance (DCE 1983); contains part of the channel (Swan River and Susannah Brook) recommended for conservation by Semeniuk, V&C Research Group (1992); contains 8647m of regionally significant river (WRC 1996a GIS)

Linkage: (Swan River and Jane Brook) canopy linkage to the north; bushland to the south (BS305), east and west; part of proposed Greenways 33, 50, 51, 52, 54, (Tingay, Alan & Associates 1997a); part of a regionally significant contiguous bushland/wetland linkage (Volume 2A, Map 8)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Rarity, 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

Opportunities and/or Constraints

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

Constraints: private land; under MRS Urban Zoning, MRD regional road requirements, General and Priority Mineral Resource Area (clay)

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s).



HELENA RIVER, HELENA VALLEY

Boundary Definition: protected area/bushland boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 215 **Map no.** 53, 54 **Map sheet series ref. no.** 2134-III SW
System 6 (1983): Part M33, part M34 part System area bushland and part scattered native plants, all vegetation described

Other Names: not known

Area (ha): total 80.7; bushland 77.7

Local Authorities (Suburb)

Zoning

Shire of Mundaring (Helena Valley, Darlington), Shire of Kalamunda (Gooseberry Hill, Piesse Brook, Helena Valley)

MRS: Rural, Parks and Recreation

TPS: Landscape, Rural Landscape Living

Ownership Categories

Commonwealth Government, State Government, Local Government

Lot/Location/Reserve numbers (Purpose), Street name

3, 34, 35, 36, 37 Clayton Rd; 38, 39 Fyfe St; 0, 11, 252, 253, 254, 255, 256, 257, 258 Helena Valley Rd; 216, 217, 582, 2822 Victor Rd; 14 Atoifi Gdns; 12742 street not identified; Water

Crown Reserve

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Darling Plateau (Darling Range)/Darling Scarp

Even-grained Granite (Ae, Aes: M3, GR)

Foothills

Colluvial Deposits (Qc: Mgs2)

Pinjarra Plain

Guildford Formation (Qpa: Mgs1) (Qha: Cm2)

VEGETATION AND FLORA

Vegetation Complex

Scarps

Darling Scarp Complex

Foothills

Forrestfield Complex (Ridge Hill Shelf, Darling Plateau)

Pinjarra Plain

Swan Complex

Floristic Community Types: not sampled, types not inferred.

WETLANDS

Wetland Types: river, creek

Natural Wetland Groups (undefined areas included in boundary)

Darling Plateau

Walyunga (D.1)

Wetland Management Objectives: Conservation (930m)

Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Not determined

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated wetland, creek

Vegetation and Flora: limited survey (DEP 1998)

Structural Units

Uplands (aerial photograph interpretation after BS217): *Eucalyptus wandoo* Low Open Woodland to Open Woodland; *Eucalyptus calophylla* Open Woodland; *Hakea lissocarpha* and *Acacia pulchella* Open Heath

Wetlands : *Eucalyptus rudis* Tall Open Forest; *Melaleuca raphiophylla* Open Forest; *Eucalyptus calophylla* Open Woodland to Woodland

Scattered Native Plants: *Eucalyptus calophylla* Woodland to Open Woodland

Vegetation Condition: 30% Very Good, >30% Good, 40% Degraded, with areas of severe localised disturbance

Total Flora: not known

Significant Flora: *Anthocercis gracilis* (R), *Hakea myrtoides* (3)

Fauna: no systematic survey. Significant mammal species: Quenda (Friend 1996 D)

Linkage: adjacent bushland to the north and west; part of a regionally significant fragmented bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: naturally vegetated watercourses have particular conservation value in providing habitat for fauna and linkage between larger more intact areas of bushland; contains open space of regional significance (DCE 1983); contains 4860m of regionally significant river (WRC 1996a GIS)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Rarity, 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

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

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s).

BENNETT BROOK, EDEN HILL TO WEST SWAN

Boundary Definition: protected area/bushland boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 305 **Map no.** 47, 52 **Map sheet series ref. no.** 2034-II NE, 2034-II SE
System 6 (1983): Part M19, M41 area of bushland goes beyond System area boundaries, all bushland described

Other Names

Contains Success Hill Reserve

Local Authorities (Suburb)

Shire of Swan (West Swan, Caversham, Guildford, Midland, Beechboro), Town of Bassendean (Eden Hill, Bassendean)

Area (ha): total 179.3 (includes open water); bushland 119.9

Zoning

MRS: Parks and Recreation, Rural, Waterways, Railways, Controlled Access Highways, Important Regional Roads, Urban, Public Purposes-Hospital, Public Purposes-Special Uses

TPS: Landscape, General Rural, Swan Valley Rural, Private Clubs and Institutions, Single Residential

Lot/Location/Reserve numbers (Purpose),

Street name

(Creekline and riverine lots not identified)
28 Meadow St; 1 West Swan Rd; 16, 17, 75, 76, 133, 10206 Lord St; 0, 9, 10, 11, 12, 13, 14, 15, 16, 17, 101, 102, 103 Bennett St; 0 Widgee Rd; 30, 31, 40, 104, 12781, 12782 Victoria Rd; 41 Borah Ct; 99, 100, 134 Patricia St; 1, 18, 96, 190, 601 Swan St; 14, 51 Market St; 2988, 3082 Harper St; 12350 Valley Brook Rd; 3, 12, 15, 23 Benara Rd; 5, 72, 73 Coast Rd; 10, 11 Marshall Rd; 12444, 12445 Brookside Gdns; 11 Valley Brook Rd

Crown Reserve

Ownership Categories

State Government, Private (including commercial organisation), Local Government, Not identified

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Pinjarra Plain

Guildford formation (Qpa: Mgs1) (Qha: Mc1)

Bassendean Dunes

Bassendean Sands (Qpb: S8)

Bassendean Dunes/Pinjarra Plain

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

VEGETATION AND FLORA

Vegetation Complex

Pinjarra Plain

Guildford Complex

Swan Complex

Combinations of Bassendean Dunes/Pinjarra Plain

Southern River Complex

Floristic Community Types

Supergroup 2: Seasonal Wetlands

S7 Northern woodlands to forests over tall sedgelands alongside permanent wetlands

REGIONAL WETLANDS

Wetland Types: floodplain, dampland, palusplain, river, creek, artificial channel, estuary (waterbody)

Natural Wetland Groups

Bassendean—Pinjarra transition OR Bassendean with fluvial features

Bennett Brook (B/P.4)

Bassendean Dunes

Jandakot (B.3)

Swan Coastal Plain Rivers

Swan River (R.2)

Wetland Management Objectives: Conservation (123ha, 293.6m), Resource Enhancement, Multiple Use

Swan Coastal Plain Lakes EPP: 20.4ha

THREATENED ECOLOGICAL COMMUNITIES

Not determined

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: open water, vegetated wetland, river, creek, estuary, vegetated uplands

Vegetation and Flora: limited survey (DEP 1996 (Benn 01-03), EPA and WAWA 1990, Keighery, BJ, 1996b)

Structural Units: mapping (EPA and WAWA 1990)

Uplands: *Banksia attenuata* and *B. menziesii* Low Open Woodland

Wetlands: *Eucalyptus rudis* Woodland to Closed Forest; *Melaleuca raphiophylla* Low Open Forest to Low Closed Forest; *Casuarina obesa* and *Melaleuca raphiophylla* Low Woodland to Low Open Forest; *Eucalyptus rudis*, *Melaleuca raphiophylla* Low Open Forest; Open Low Heaths of *Halosarcia halocnemoides*, *H. lepidosperma*, *H. pergranulata* and *Sarcocornia quinqueflora*; Sedgelands to Closed Sedgelands dominated by *Bolboschoenus caldwellii* and **Typha orientalis*

Scattered Native Plants: *Eucalyptus rudis* Woodland

Vegetation Condition: >70% Good to Excellent, <30% Degraded, with areas of severe localised disturbance

Total Flora: 62 native taxa, 21 weeds (Keighery, BJ, 1996b) (estimated >75% expected flora)

Significant Flora: the co-occurrence of the four samphire species — *Halosarcia halocnemoides*, *H. lepidosperma*, *H. pergranulata* and *Sarcocornia quinqueflora* — is unusual (L. Pen pers. comm. in BJ Keighery 1996b); *Sarcocornia blackiana* (known from one other locality, L. Pen pers. comm. in BJ Keighery 1996b)

Fauna: multiple and structured surveys by Cooper *et al.* (in press) and RAOU (1996 D) for birds (73), and by Cooper *et al.* (in press) for native mammals (1), reptiles (12) and amphibians (7). Significant bird species: category 1 (2), category 3 (8) and category 4 (5). Significant mammal species: Quenda (Friend 1996 D)

Linkage: adjacent bushland to the north (BS304) and east (BS302); part of proposed Greenways 21, 50 (Tingay, Alan & Associates 1997a); part of contiguous and fragmented bushland/wetland linkages (Volume 2A, Map 8)

Other Special Attributes: the largest and most diverse relatively intact lagoonal system on the Swan-Canning River Estuary (L. Pen pers. comm. in BJ Keighery 1996b); one of a very limited number of bushland areas on the Swan Estuary, naturally vegetated areas on the Swan Estuary having particular conservation value in providing habitat for fauna and linkage between areas of bushland; open space of regional significance (DCE 1983); contains part of a channel (Bennett Brook) recommended for conservation by Semeniuk, V&C Research Group (1992); contains 3183m of regionally significant river (WRC 1996a GIS)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Rarity, Maintaining ecological processes or natural systems, 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

Opportunities and/or Constraints

Opportunities: Bushplan Site/part Bushplan Site subject to Swan and Canning Rivers EPP, Swan Coastal Plain Lakes EPP; location of Scheduled Fauna, conservation category wetland; under MRS Parks and Recreation Reservation and TPS Zoning, Crown Reserve

Constraints: private land; under MRS Urban Zoning

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s). Parts of this Bushplan Site are already reserved for Parks and Recreation in the Metropolitan Region Scheme and should be protected as a reserve with a conservation purpose.

SWAN RIVER BACKWATER, SOUTH GUILDFORD

Boundary Definition: System 6 area boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 491 **Map no.** 52 **Map sheet series ref. no.** 2034-II SE

System 6 (1983): M44 part System area bushland and part scattered native plants (canopy), all vegetation described

Other Names: not known

Area (ha): total 1.3 (includes open water); <0.6 bushland

Local Authorities (Suburb)

Zoning

Shire of Swan (South Guildford)

MRS: Parks and Recreation, Urban, Waterways

Ownership Categories

TPS: No zone

State Government, Private (including commercial organisation), Not identified

Lot/Location/Reserve numbers (Purpose),

Street name

3, 58 Kidman Ave; 55 Wilkie St; 0, 23, 47, 48, 49, 50, 51, 52, 54 River View Ave

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Pinjarra Plain

Guildford Formation (Qha: Ms4)

Bassendean Dunes/Pinjarra Plain

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

VEGETATION AND FLORA

Vegetation Complexes

Pinjarra Plain

Swan Complex

Floristic Community Types: not sampled, types not inferred

WETLANDS

Wetland Types: floodplain, estuary (peripheral)

Natural Wetland Groups

Swan Coastal Plain Rivers

Swan River (R.2)

Estuaries

Swan River (E.2)

Wetland Management Objectives: Conservation (15ha), Resource Enhancement

Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Not determined

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: open water, vegetated wetland, estuary

Vegetation and Flora: limited survey (DEP 1998, Pen 1983)

Structural Units: mapping (Pen 1983)

Wetlands (wetflats): *Eucalyptus rudis* Forest to Woodland; *Melaleuca raphiophylla* Low Open Forest to Low Woodland; *Casuarina obesa* and *Melaleuca raphiophylla* Low Woodland to Low Open Forest; *Sarcocornia quinqueflora* Low Shrubland to Closed Low Heath; Closed Sedgelands to Sedgelands dominated by *Bolboschoenus caldwellii* and *Juncus kraussii*

Scattered Native Plants: *Eucalyptus rudis* Forest to Woodland - regionally significant vegetation recognised as being included in the area of Bushplan Site in need of protection

Vegetation Condition: Very Good to Degraded

Total Flora: not known

Significant Flora: none recorded

Fauna: no known information

Linkage: canopy/creepline linkage to north and south; part of proposed Greenway 24 (Tingay, Alan & Associates 1997a); part of regionally significant contiguous bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: one of a very limited number of bushland areas on the Swan Estuary, naturally vegetated areas on the Swan Estuary having particular conservation value in providing habitat for fauna and linkage between areas of bushland; open space of regional significance (DCE 1983)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Directory of Important Wetlands in Australia



SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria met for inclusion: Representation of ecological communities, 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

Opportunities and/or Constraints

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

Constraints: private land; under MRS Urban Zoning

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s). This may include: The existing care, control and management intent of the reserve is endorsed. Long-term security and support for conservation management of the Bushplan Site be enhanced by: amending the purpose of the reserve to include conservation; and applying appropriate mechanisms in consultation with the reserve management body.

ASHFIELD FLATS, BASSENDEAN/ASHFIELD

Boundary Definition: protected area/bushland boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 214 **Map no.** 52 **Map sheet series ref. no.** 2034-II SE

Other Names

Ashfield Flats Submission Area 253

Local Authorities (Suburb)

Town of Bassendean (Bassendean, Ashfield)

Ownership Categories

State Government, Local Government, Private

Area (ha): total 40.6; bushland 11.1

Zoning

MRS: Parks and Recreation, Urban, Waterways

TPS: Group Residential, Landscape, Recreation

Lot/Location/Reserve numbers (Purpose),

Street name

9, 300, 667, 4689 Kitchener Rd; 1092, 1094, 1095, 1096, 1097, 4690 Ashfield Pde; 0, 3, 12, 663, 1062 Hardy Rd; 63, 64, 65, 66, 616, 617 Hamilton St; 67, 69 Villiers St; 3093 West Rd
Crown Reserve

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Pinjarra Plain

Alluvial Colluvial Deposit (Qha/Qc: Ms4)

Bassendean Dunes

Bassendean Sands (Qpb: S8)

VEGETATION AND FLORA

Vegetation Complex

Pinjarra Plain

Swan Complex

Floristic Community Types: not sampled, types not inferred

WETLANDS

Wetland Types: artificial channel, estuary (waterbody), estuary (shoreline and peripheral)

Natural Wetland Groups

Estuaries

Swan River (E.2)

Wetland Management Objectives: Conservation (39.6ha)

Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Not determined

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated wetland, estuary

Vegetation and Flora: limited survey (Appropriate Technology Group (Inc.) 1988, Connell 1995, Pen 1983)

Structural Units: mapping (Appropriate Technology Group (Inc.) 1988, Pen 1983)

Wetlands: *Eucalyptus rudis* Woodland to Open Woodland; *Melaleuca raphiophylla*, *M. viminea* Low Woodland to Low Open Forest; *Casuarina obesa*, *Melaleuca raphiophylla* Low Woodland to Low Open Forest;



Part B DESCRIPTIONS

Sarcocornia quinqueflora Low Shrubland to Closed Low Heath; *Halosarcia indica* subsp. *bidens* and *H. halocnemoides* Low Shrubland to Closed Low Heath; *Schoenoplectus validus* Sedgeland to Closed Sedgeland; *Juncus kraussii* Sedgeland to Closed Sedgeland; Closed Sedgelands dominated by *Bolboschoenus caldwellii* and **Typha orientalis*

Scattered Native Plants: *Eucalyptus rudis* Woodland to Open Woodland

Vegetation Condition: varies from areas in Excellent Condition to Completely Degraded

Total Flora: 22 native taxa, 22 weeds (Appropriate Technology Development Group (Inc.) 1988) (>50% of expected flora)

Significant Flora: none recorded

Fauna: limited surveys by Appropriate Technology Group (Inc.) (1988) for birds (51), also abundant frogs noted. Good assemblage of wide-ranging and transient bird species. Significant bird species: category 3 (1)

Linkage: no adjacent bushland; part of proposed Greenway 24 (Tingay, Alan & Associates 1997a); part of a regionally significant contiguous bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: one of a very limited number of bushland areas on the Swan Estuary, naturally vegetated areas on the Swan Estuary having particular conservation value in providing habitat for fauna and linkage between areas of bushland

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Directory of Important Wetlands in Australia (Swan River)

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, 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

Opportunities and/or Constraints

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

Constraints: private land; under MRS Urban Zoning

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s).

SWAN RIVER SALTMARSHES, BAYSWATER/MAYLANDS

Boundary Definition: protected area/bushland (part taken to cadastre) boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 313 **Map no. 51, 57** **Map sheet series ref. no. 2034-II SE**
System 6 (1983): M51 area of bushland goes beyond System area boundaries, all bushland described

Other Names

Submission Area 209

Local Authorities (Suburb)

City of Bayswater (Bayswater), City of Belmont (Ascot)

Ownership Categories

State Government

Area (ha): total 49.2; bushland 38.6

Zoning

MRS: Parks and Recreation, Waterways, Private Recreation

TPS: Landscape

Lot/Location/Reserve numbers (Purpose),

Street name

556, 561 Hardey Rd; 226, 230 Harold St; 1, 2, 3
Clarkson Rd; 224, 225 Waterway Cr; 304 Swan View
Tce; 0, 107 Stone St

Crown Reserve

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Pinjarra Plain

Guildford Formation (Qpa: Ms2) (Qha: Mc1)

Alluvial Colluvial Deposit (Qha/Qc: Ms4)

Bassendean Dunes

Bassendean Sands (Qpb: S8)

VEGETATION AND FLORA

Vegetation Complexes

Pinjarra Plain

Guildford Complex

Swan Complex

Floristic Community Types: not sampled, types not inferred

REGIONAL WETLANDS

Wetland Types: artificial channel, creek, estuary (waterbody), estuary (shoreline and peripheral)

Natural Wetland Groups

Estuaries

Swan River (E.2)

Wetland Management Objectives: Conservation (39.6ha, 393.8m)

Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Not determined

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated wetland, creek, estuary, vegetated uplands

Vegetation and Flora: detailed survey (Connell 1995, Regeneration Technology 1994, Smith, P, 1985); limited survey (EPA 1985b, Pen 1983)

Structural Units: mapping (Pen 1983, Regeneration Technology 1994, Smith, P, 1985)

Wetlands: *Eucalyptus rudis* Open Woodland; *Melaleuca raphiophylla* Low Woodland to Low Open Forest with patches of *Juncus pallidus* Sedgeland; *Casuarina obesa* and *Melaleuca raphiophylla* Low Woodland to Low Open Forest; *Sarcocornia quinqueflora* and *Suaeda australia* Low Shrubland to Closed Low Heath; *Halosarcia indica* subsp. *bidens* and *H. halocnemoides* Low Shrubland to Closed Low Heath; *Juncus kraussii* Sedgeland to Closed Sedgeland; Closed Sedgelands dominated by *Bolboschoenus caldwellii* and **Typha orientalis*

Scattered Native Plants: not assessed

Vegetation Condition: varies from areas in Excellent Condition to Completely Degraded

Total Flora: 46 native taxa, 39 exotics (Smith, P, 1985) (estimated >50% expected flora)

Significant Flora: not surveyed

Fauna: multiple and structured surveys for birds (80), native mammals (1), reptiles (7) and amphibians (6) (Siemon 1991). Significant waterbird habitat including breeding, feeding and wading habitats. Significant bird species: category 1 (1), category 3 (7) and category 4 (6). Significant mammal species: Water Rat. Significant reptile species: Mourning Skink (*Egernia luctuosa*)

Linkage: no adjacent bushland; part of proposed Greenway 24 (Tingay, Alan & Associates 1997a); part of a regionally significant contiguous bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: one of a very limited number of bushland areas on the Swan Estuary, naturally vegetated areas on the Swan Estuary having particular conservation value in providing habitat for fauna and linkage between areas of bushland; contains open space of regional significance (DCE 1983)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Directory of Important Wetlands in Australia

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Rarity, 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

Opportunities and/or Constraints

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

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s).

SWAN RIVER FORESHORE, MOUNT LAWLEY/MAYLANDS

Boundary Definition: protected area/bushland (part taken to cadastre) boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 314 **Map no. 51, 57** **Map sheet series ref. no. 2034-II SE**
System 6 (1983): Part M50 area of bushland goes beyond System area boundaries, all bushland described

Other Names

Maylands Foreshore Reserve, Berringa Park

Local Authorities (Suburb)

City of Bayswater (Maylands, Mount Lawley), Town of Vincent (Mt Lawley)

Area (ha): total 27.7; bushland 16.7

Zoning

MRS: Urban, Parks and Recreation, Waterways
TPS: Landscape, Medium Density Residential



Ownership Categories

Local Government, State Government, Not identified

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

101 Mitchell St; 0 Thirlmere Rd; 6 Guildford Rd; 13, 20,
10141 Fourth Ave; 10731 Bardon Pl; 1 Mary St
Crown Reserve

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Pinjarra Plain

Alluvial Colluvial Deposit (Qha/Qc: Mc1)

Bassendean Dunes

Bassendean Sands (Qpb: S8)

Spearwood Dunes

Sands derived from Tamala Limestone (Qts: S7)

VEGETATION AND FLORA

Vegetation Complexes

Pinjarra Plain

Guildford Complex

Swan Complex

Bassendean Dunes

Bassendean Complex — Central and South

Spearwood Dunes

Karrakatta Complex — Central and South

Marine (lagoonal and estuarine) Deposits

Vasse Complex (most northern occurrence)

Floristic Community Types: not sampled, types not inferred

WETLANDS

Wetland Types: creek, estuary (waterbody), estuary (shoreline and peripheral)

Natural Wetland Groups

Bassendean Dunes

Jandakot (B.3)

Estuaries

Swan River (E.2)

Wetland Management Objectives: Conservation (18.5ha), Multiple Use

Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Not determined

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated wetland, creek, estuary

Vegetation and Flora: detailed survey (Meney 1989); limited survey (Connell 1995, Pen 1983)

Structural Units: mapping (Meney 1989, Pen 1983)

Wetlands: *Melaleuca raphiophylla* Low Woodland to Low Open Forest with patches of *Juncus pallidus* Sedgeland; *Casuarina obesa* and *Melaleuca raphiophylla* Low Woodland to Low Open Forest; *Sarcocornia quinqueflora* and *Suaeda australis* Low Shrubland to Closed Low Heath; *Halosarcia indica* subsp. *bidens* and *H. halocnemoides* Low Shrubland to Closed Low Heath; *Juncus kraussii* Sedgeland to Closed Sedgeland; Closed Sedgelands dominated by *Bolboschoenus caldwellii* and **Typha orientalis*

Scattered Native Plants: not assessed

Vegetation Condition: varies from areas in Excellent Condition to Completely Degraded

Total Flora: 47 native taxa, 38 weeds (Meney 1989) (estimated >80% expected flora)

Significant Flora: none recorded

Fauna: multiple surveys for birds (68) (Smith, P, 1985, Jaesch 1987) and limited surveys for native mammals (3), reptiles (8) and amphibians (4) (Meney 1989). Key site for water-birds feeding and breeding area especially ducks and rails. Significant bird species: category 1 (1), category 2 (3), category 3 (8) and category 4 (2). Significant reptile species: Mourning Skink (*Egernia luctuosa*)

Linkage: no adjacent bushland; part of proposed Greenway 24 (Tingay, Alan & Associates 1997a); part of a regionally significant contiguous bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: 'area represents 11 of the 21 communities identified along the Swan and Canning foreshore' (Meney 1989); is one of a very limited number of bushland areas on the Swan Estuary, naturally vegetated areas on the Swan Estuary having particular conservation value in providing habitat for fauna and linkage between areas of bushland; contains open space of regional significance (DCE 1983)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Directory of Important Wetlands in Australia; Not listed; Indicative Place of the Register of the National Estate; Location for JAMBA/CAMBA species

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Diversity, Rarity, Maintaining ecological processes or natural systems, 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

Opportunities and/or Constraints

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

Constraints: under MRS Urban Zoning

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s).

PELICAN POINT, CRAWLEY

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

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 402 **Map no.** 56 **Map sheet series ref. no.** 2034-II SW

System 6 (1983): M62 part System area bushland and part scattered native plants (canopy), all vegetation described

Other Names: not known

Area (ha): total 24.1; bushland 0 (note comment under Boundary Definition)

Local Authorities (Suburb)

Zoning

City of Subiaco (Crawley)

MRS: Parks and Recreation

Ownership Categories

TPS: Landscape

State Government

Lot/Location/Reserve numbers (Purpose), Street name

5390, 7568, 7996, 8167, 8168, 8169, 8442, 8443, 10020 Hackett Dr

Crown Reserve

CALM Managed Land

Reserve 17375 (Recreation), Reserve 40891 (Marine Park)

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Pinjarra Plain

Guildford Formation (Qha: S14)

Spearwood Dunes

Sands derived from Tamala Limestone (Qts: S7) (not naturally vegetated)

VEGETATION AND FLORA

Vegetation Complex

Marine (lagoonal and estuarine) Deposits

Vasse Complex

Floristic Community Types: not sampled, types not inferred

WETLANDS

Wetland Types: estuary (waterbody), estuary (shoreline and peripheral)

Natural Wetland Groups

Estuaries

Swan River (E.2)

Wetland Management Objectives: Conservation (17.1ha)

Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Not determined

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated wetland, vegetated uplands, estuary

Vegetation and Flora: detailed survey (Keighery, GJ, 1990b), limited survey (CALM 1992b)

Structural Units: mapping (CALM 1992b)

Wetlands: *Eucalyptus rudis* Woodland; *Melaleuca raphiophylla* Open Woodland; *Melaleuca cuticularis* Low Woodland; *Juncus kraussii* Closed Sedgeland; *Bolboschoenus caldwellii*, *Cyperus gymnocaulos* and *C. tenuiflora* Mixed Closed Sedgeland

Scattered Native Plants: *Eucalyptus gomphocephala* and *E. calophylla* Tall Woodland; *Eucalyptus gomphocephala* Tall Open Woodland; *Eucalyptus rudis* Woodland; *Casuarina obesa* Low Open Woodland; *Acacia saligna* Tall Open Shrubland - regionally significant vegetation recognised as being included in the area of Bushplan Site in need of protection

Vegetation Condition: >20% Excellent to Very Good, <80% Good to Degraded, with areas of severe localised disturbance

Total Flora: 27 native taxa (Keighery, GJ, 1990b) (estimated >80% expected flora)

Significant Flora: none identified

Fauna: structured multiple surveys by Job (1972) and by RAOU (1996 D), 13 visits, for birds (90). Large assemblage (17 species) and population levels of trans-equatorial wading birds protected under the JAMBA/CAMBA treaties. Significant bird species: category 1 (1), category 2 (17), category 3 (2) and category 4 (5); Moaning Frog (BJ and GJ Keighery pers. comm.)

Linkage: no adjacent bushland; part of proposed Greenway 24 (Tingay, Alan & Associates 1997a); part of a regionally significant contiguous bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: is one of a very limited number of bushland areas on the Swan Estuary, naturally vegetated areas on the Swan Estuary having particular conservation value in providing habitat for fauna and linkage between areas of bushland; open space of regional significance (DCE 1983)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Listed on the Register of the National Estate; Directory of Important Wetlands in Australia (Swan-Canning Estuary System); Location for JAMBA/CAMBA species

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Rarity, 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

Opportunities and Constraints

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

Recommendation: The existing purpose, care, control and management of Reserves 17375, 40891 is endorsed.

POINT RESOLUTION RESERVE, DALKEITH

Boundary Definition: protected area/bushland taken to cadastre boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 221 **Map no.** 60 **Map sheet series ref. no.** 2033-I NW

System 6 (1983): M59 part System area bushland and part scattered native plants (canopy), all vegetation described

Other Names: not known

Local Authorities (Suburb)

City of Nedlands (Dalkeith)

Ownership Categories

State Government

Area (ha): total 8.7; bushland 3.3

Zoning

MRS: Parks and Recreation, Urban, Waterways

TPS: Landscape, Residential

Lot/Location/Reserve numbers (Purpose),

Street name

10694 Jutland Pde

Crown Reserve

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Spearwood Dunes

Sands derived from Tamala Limestone (Qts: S7)

Tamala Limestone (Qtl: LS1)

VEGETATION AND FLORA

Vegetation Complex

Spearwood Dunes

Karrakatta Complex — Central and South

Floristic Community Types: not sampled, types not inferred



WETLANDS

Wetland Types: estuary (waterbody)

Natural Wetland Groups

Estuaries

Swan River (E.2)

Wetland Management Objectives: Conservation (0.3ha)

Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Not determined

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated uplands, vegetated wetlands, estuary

Vegetation and Flora: limited survey (Ecoscape 1991), detailed survey (Keighery, GJ, and Keighery 1998)

Structural Units: mapping (Ecoscape 1991)

Uplands (slopes) - Sands derived from Tamala Limestone: *Eucalyptus gomphocephala* Open Woodland; *Agonis flexuosa*, *Banksia* sp. and *Callitris preissii* Low Woodland; *Eucalyptus decipiens* Low Open Woodland

Uplands (slopes) - Tamala Limestone: *Dryandra sessilis* var. *cygnorum* Open Heath

Wetlands (wetflats): *Juncus kraussii* Sedgeland; *Isolepis nodosus* Sedgeland

Scattered Native Plants: Mixed *Eucalyptus gomphocephala*, *E. marginata* and *E. calophylla* Tall Open Woodland with a remnant understorey of *Xanthorrhoea preissii* and *Macrozamia riedlei*

Vegetation Condition: >20% Very Good, 80% Degraded, with areas of severe localised disturbance

Total Flora: 60 native taxa (Ecoscape 1991; Keighery, GJ, and Keighery 1998) (estimated >90% expected flora)

Significant Flora: none recorded

Fauna: limited surveys for birds (43), native mammals (2) and reptiles (6) (Ecoscape 1991). Significant bird species: category 1 (1), category 2 (3), category 3 (2) and category 4 (1)

Linkage: no adjacent bushland; part of proposed Greenway 24 (Tingay, Alan & Associates 1997a); part of a regionally significant contiguous bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: naturally vegetated areas on the Swan Estuary have particular conservation value in providing habitat for fauna and linkage between larger, more intact areas of bushland; one of the few naturally vegetated areas on the Swan Estuary; open space of regional significance (DCE 1983)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Directory of Important Wetlands in Australia (Swan-Canning Estuaries); Location for JAMBA/CAMBA species

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Rarity, 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

Opportunities and/or Constraints

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

Constraints: under MRS Urban Zoning

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.

PEPPERMINT GROVE FORESHORE

Boundary Definition: protected area/bushland (part taken to zoning) boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 403

Map no. 55, 60

Map sheet series ref. no. 2033-I NW, 2034-II

SW

System 6 (1983): M54 part System area bushland and part scattered native plants (canopy), all vegetation described

Other Names

Part Submission Area 190

Local Authorities (Suburb)

Shire of Peppermint Grove (Peppermint Grove)

Area (ha): total 3.1; bushland 1.7

Zoning

MRS: Parks and Recreation, Urban, Waterways

TPS: Landscape

Ownership Categories
State Government

Lot/Location/Reserve numbers (Purpose),
Street name
2539 The Esplanade
Crown Reserve

SECTION 2: REGIONAL INFORMATION
LANDFORMS AND SOILS

Pinjarra Plain
Guildford Formation (Qha: S14)
Spearwood Dunes
Tamala Limestone (Qtl: LS1)

VEGETATION AND FLORA

Vegetation Complexes

Spearwood Dunes
Cottesloe Complex - Central and South

Floristic Community Types

Supergroup 4: Uplands centred on Spearwood and Quindalup Dunes

30a2 Woodlands and shrublands on Holocene Dunes (DEP 1996, re-allocated from 30a, equivalent to 30a in Gibson *et al.* 1994, English and Blyth 1997)

WETLANDS

Wetland Types: estuary (waterbody)

Natural Wetland Groups

Estuaries
Swan River (E.2)

Wetland Management Objectives: Conservation (0.3ha)

Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Endangered (floristic community type 30a as defined by Gibson *et al.* 1994)

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: estuary — limestone cliff, vegetated wetland, vegetated uplands

Vegetation and Flora: limited survey (Gibson *et al.* 1994 (Pepgrv 01-02)); detailed survey (Keighery, GJ, and Keighery 1998)

Structural Units

Tamala Limestone: *Callitris preissii* and *Eucalyptus gomphocephala* Woodland; *Callitris preissii* Woodland

Scattered Native Plants: *Eucalyptus gomphocephala* and *Banksia* species Open Woodland

Vegetation Condition: >40% Very Good to Good, <60% Degraded, with areas of severe localised disturbance

Total Flora: 59 native taxa (Keighery, GJ, and Keighery 1998, Gibson *et al.* 1994) (estimated >75% expected flora)

Significant Flora: *Dodonaea hackettiana* (4); Keighery, GJ, and Keighery 1998 (taxa of restricted distribution on the Swan Coastal Plain associated with Swan/Canning estuarine bushland remnants) — *Callitris preissii*, *Acacia xanthina*, *Alyxia buxifolia*, *Pittosporum phylliraeoides* var. *phylliraeoides*

Fauna: no known information

Linkage: adjacent bushland to the north; part of proposed Greenway 24 (Tingay, Alan & Associates 1997a); part of a regionally significant contiguous bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: National Trust of Australia (WA) Classification; Peppermint Grove Limestone, a Middle Pleistocene emergent shell bed deposited during the Mindel-Riss interglacial period, is the most informative and well preserved natural outcrop in and around the Swan River District (Lemmon *et al.* 1979); is one of a very limited number of bushland areas on the Swan Estuary, naturally vegetated areas on the Swan Estuary having particular conservation value in providing habitat for fauna and linkage between areas of bushland; open space of regional significance (DCE 1983)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Directory of Important Wetlands in Australia

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Rarity, 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

Opportunities and/or Constraints

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

Constraints: under MRS Urban Zoning



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.

CHIDLEY POINT AND ADJACENT BUSHLAND, MOSMAN PARK

Boundary Definition: protected area/bushland taken to cadastre boundary (Areas of bushland/native vegetation within the boundaries of the Bushplan Site are not accurately mapped.)

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 334 **Map no.** 60 **Map sheet series ref. no.** 2033-I NW

System 6 (1983): M56 part System area bushland and part scattered native plants (canopy), all vegetation described

Other Names: not known

Local Authorities (Suburb)

Town of Mosman Park (Mosman Park)

Ownership Categories

Private (including commercial organisation), State Government

Area (ha): total 17.8; bushland 3.2

Zoning

MRS: Parks and Recreation, Urban

TPS: Landscape

Lot/Location/Reserve numbers (Purpose),

Street name

13, 20, 78, 81, 82, 102, 602, 608, 611, 9800 Saunders St; 36, 38 The Coombe; 22, 23, 24, 25, 11074 Riverview Pl; 3, 81 Bateman St; 105, 133, 134, 135, 136, 137, 141, 142, 143, 144, 145, 146, 147, 148, 149, 161 Bay View Tce; 12059 Chine Pl
Crown Reserve

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Spearwood Dunes

Tamala Limestone (Qtl: LS1)

VEGETATION AND FLORA

Vegetation Complex

Spearwood Dunes

Cottesloe Complex — Central and South

Floristic Community Types

Supergroup 4: Uplands centred on Spearwood and Quindalup Dunes

24 Northern Spearwood shrublands and woodlands

WETLANDS

Wetland Types: estuary (waterbody)

Natural Wetland Groups

Estuaries

Swan River (E.2)

Wetland Management Objectives: Conservation (0.3ha)

Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Not assessed

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: estuary — limestone cliff, vegetated wetland, vegetated uplands

Vegetation and Flora: limited survey (Gibson *et al.* 1994 (Chidpt 01), Keighery, GJ, and Keighery 1998)

Structural Units

Uplands (slopes) - Sands derived from Tamala Limestone: *Eucalyptus gomphocephala* and *Banksia* species Open Woodland

Uplands - Tamala Limestone: *Dryandra sessilis* var. *cygnorum* and *Acacia xanthina* Tall Open Scrub

Wetlands (wetflats): *Juncus kraussii* Sedgeland

Scattered Native Plants: *Eucalyptus gomphocephala* and *Banksia* sp. Open Woodland

Vegetation Condition: >30% Very Good to Excellent, >70% Degraded to Good, with areas of severe localised disturbance

Total Flora: 69 native species (Keighery, GJ, and Keighery 1998, Gibson *et al.* 1994) (estimated >90% of flora)

Significant Flora: Keighery, GJ, and Keighery 1998 (taxa of restricted distribution on the Swan Coastal Plain associated with Swan/Canning estuarine bushland remnants) — *Acacia truncata*, *A. xanthina*

Fauna: no known information

Linkage: no adjacent bushland; part of proposed Greenway 24 (Tingay, Alan & Associates 1997a); part of a regionally significant contiguous bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: National Trust of Australia (WA) Classification; Quaternary Site, as exposures of limestone cliffs (Lemmon *et al.* 1979); naturally vegetated areas on the Swan Estuary have particular conservation value in providing habitat for fauna and linkage between larger more intact areas of bushland; one of the few naturally vegetated areas on the Swan Estuary; open space of regional significance (DCE 1983)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Directory of Important Wetlands in Australia

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, 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

Opportunities and/or Constraints

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

Constraints: private land; under MRS Urban Zoning

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s). This may include parts for which — 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.

MINIM COVE, MOSMAN PARK

Boundary Definition: protected area boundary (Areas of bushland/native vegetation within the boundaries of the Bushplan Site are not accurately mapped.)

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 335 **Map no.** 60 **Map sheet series ref. no.** 2033-I NW

System 6 (1983): M57 part System area bushland and part scattered native plants (canopy), all vegetation described

Other Names: not known

Area (ha): total 12.2; bushland 0
(See comment under Boundary Definition)

Local Authorities (Suburb)
Town of Mosman Park (Mosman Park)

Zoning
MRS: Parks and Recreation
TPS: Landscape

Ownership Categories
State Government

**Lot/Location/Reserve numbers (Purpose),
Street name**
654 Stone St; 1, 8 Fairbairn St
Crown Reserve

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Spearwood Dunes
Tamala Limestone (Qtl: LS1)

VEGETATION AND FLORA

Vegetation Complex
Spearwood Dunes
Cottesloe Complex — Central and South

Floristic Community Types: not sampled, types not inferred

WETLANDS

Wetland Types: estuary (waterbody)

Natural Wetland Groups

Estuaries
Swan River (E.2)

Wetland Management Objectives: Conservation (0.01ha)

Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Not determined

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: estuary — limestone cliff, vegetated wetland, vegetated uplands

Vegetation and Flora: limited survey (Keighery, GJ, and Keighery 1998)

Structural Units

Uplands (slopes) - Sands derived from Tamala Limestone: *Eucalyptus gomphocephala* and *Banksia* sp. Woodland

Uplands (slopes) - Tamala Limestone: *Dryandra sessilis* var. *cygnorum* Open Heath

Wetlands (wetflats): *Juncus kraussii* Closed Sedgeland

Scattered Native Plants: *Eucalyptus gomphocephala* and *Banksia* sp. Open Woodland

Vegetation Condition: >50% Very Good to Excellent, <50% Good to Degraded, with areas of severe localised disturbance

Total Flora: 71 native species (Keighery, GJ, and Keighery 1998) (estimated >80% expected flora)

Significant Flora: Keighery, GJ, and Keighery 1998 (taxa of restricted distribution on the Swan Coastal Plain associated with Swan/Canning estuarine bushland remnants) — *Boronia alata* (disjunct north from Cape Naturaliste, only population on the mainland in the Perth Region; also recorded from two other locations in the Perth area — Rottnest and Garden Islands), *Acacia xanthina*, *A. truncata*, *Alyxia buxifolia*

Fauna: opportunistic survey by B. Maryan and R. Browne-Cooper (pers. comm.) for reptiles (7)

Linkage: no adjacent bushland; part of proposed Greenway 24 (Tingay, Alan & Associates 1997a); part of a regionally significant contiguous bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: National Trust of Australia (WA) Classification; exposed Marine Shell Beds containing fossil fauna which have yet to be completely examined. Overlaid by aeolian limestones of the Tamala Limestone, they are a significant reference point for the study of sea level changes during the Quaternary (Lemmon et al. 1979); is one of a very limited number of bushland areas on the Swan Estuary, naturally vegetated areas on the Swan Estuary having particular conservation value in providing habitat for fauna and linkage between areas of bushland; open space of regional significance (DCE 1983)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Directory of Important Wetlands in Australia; Listed on the Register of the National Estate

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, 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

Opportunities and/or Constraints

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

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.

CANTONMENT HILL, FREMANTLE

Boundary Definition: System 6 area boundary (Areas of bushland/native vegetation within the boundaries of the Bushplan Site are not accurately mapped. The boundary has been drawn to include any unmapped bushland/native vegetation.)

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 490 **Map no.** 60 **Map sheet series ref. no.** 2033-I NW

System 6 (1983): M71 part System area bushland and part scattered native plants (canopy), only bushland described

Other Names: not known

Area (ha): total 0.8; bushland 0 (note comment above under Boundary Definition)

Local Authorities (Suburb)

City of Fremantle (Fremantle)

Zoning

MRS: Urban

TPS: Local Reserve-Open Space

Ownership Categories

Local Government

Lot/Location/Reserve numbers (Purpose),

Street name

0 Canning Hwy



SECTION 2: REGIONAL INFORMATION**LANDFORMS AND SOILS****Spearwood Dunes**

Tamala Limestone (Qtl: LS1)

VEGETATION AND FLORA**Vegetation Complexes****Spearwood Dunes**

Cottesloe Complex - Central and South

Floristic Community Types: * types inferred**Supergroup 4 - Uplands centred on Spearwood and Quindalup Dunes**

*24 Northern Spearwood shrublands and woodlands

WETLANDS

No wetlands mapped

THREATENED ECOLOGICAL COMMUNITIES

Not assessed

SECTION 3: SPECIFIC SITE DETAIL**Landscape Features:** limestone ridge, vegetated uplands**Vegetation and Flora:** limited survey (DEP 1996, Ecoscape 1989)**Structural Units:** mapping (Ecoscape 1989)Uplands (slopes): *Acacia xanthina* Tall Open Scrub**Vegetation Condition:** Good to Degraded**Total Flora:** 20 native taxa, 27 weeds (compiled from DEP 1996 and Ecoscape 1989; some of these natives may be planted) (estimated >80% expected flora)**Significant Flora:** most southerly location for *Acacia xanthina*; a series of species associated with the Spearwood Dunes (sands and Tamala Limestone) the occurrence of which is extended inland along the river — *Acacia xanthina*, *Acanthocarpus preissii*, *Dodonaea aptera*, *Spyridium globulosum* and *Templetonia retusa*.**Fauna:** limited survey by Ecoscape (1989) for birds (16) and reptiles (2)**Linkage:** no adjacent bushland**Other Special Attributes:** naturally vegetated areas alongside the Swan Estuary have particular conservation value in providing habitat for fauna and linkage between larger, more intact areas of bushland; one of the few naturally vegetated areas on the Swan Estuary; open space of regional significance (DCE 1983)**SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE**

Not listed

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS**Criteria met for inclusion:** Representation of ecological communities, 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**Opportunities and/or Constraints****Opportunities:** Bushplan Site/part Bushplan Site subject to Swan and Canning Rivers EPP; under TPS Local Reserve - Open Space Zoning**Constraints:** under MRS Urban Zoning**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.**BLACKWALL REACH, POINT WALTER, ALFRED COVE AND ADJACENT BUSHLAND, BICTON TO APPECROSS****Boundary Definition:** protected area/bushland (part taken to cadastre)/bushland group boundary (Areas of bushland/native vegetation within the boundaries of the Bushplan Site are not accurately mapped.)**SECTION 1: CADASTRAL INFORMATION**

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

Bushplan Site no. 331 **Map no.** 60, 61 **Map sheet series ref. no.** 2033-I NW**System 6 (1983):** M58 and part M61 area of bushland goes beyond System area boundaries, all bushland described

Other Names

Point Waylen, Submission Area 188
Local Authorities (Suburb)
 City of Melville (Attadale, Alfred Cove)

Ownership Categories

Local Government, State Government

CALM Managed Land

Area (ha): total 109.8; bushland 30.8

Zoning

MRS: Parks and Recreation, Urban, Waterways
TPS: Landscape
Lot/Location/Reserve numbers (Purpose), Street name
 10, 11143, 11543 Burke Dr; 9, 10, 31, 38 Canning Hwy;
 0 Dunkley Ave
 Reserve 35066 (Conservation of Flora and Fauna), 44414
 (Conservation and Radio Facilities)

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Pinjarra Plain

Guildford Formation (Qha: S14, Sm1)

Spearwood Dunes

Sands derived from Tamala Limestone (Qts: S7)

Tamala Limestone (Qtl: LS1)

VEGETATION AND FLORA

Vegetation Complex

Spearwood Dunes

Karrakatta Complex — Central and South

Cottesloe Complex — Central and South

Floristic Community Types

Supergroup 2: Seasonal Wetlands

16 Highly saline seasonal wetlands

S7 Northern woodlands to forests over tall sedgeland alongside permanent wetlands (most southerly occurrence)

Supergroup 4: Uplands centred on Spearwood and Quindalup Dunes

24 Northern Spearwood shrublands and Woodlands

WETLANDS

Wetland Types: estuary (waterbody), estuary (shoreline and peripheral)

Natural Wetland Groups

Estuaries

Swan River (E.2)

Wetland Management Objectives: Conservation (10.5ha)

Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Not assessed, Not determined

SECTION 3: SPECIFIC SITE DETAIL

Blackwall Reach and Point Walter

Landscape Features: estuary — limestone cliff, vegetated wetland, estuary, vegetated uplands

Vegetation and Flora: detailed survey (part Bushplan Site — Keighery, GJ, 1991a); limited survey (Gibson *et al.* 1994 (Ptwalt 01), Smith, V, and Smith 1986, Greening WA Pt Walter Group 1994)

Structural Units

Spearwood Dunes

Uplands - Sands derived from Tamala Limestone: *Agonis flexuosa* Woodland and *Banksia attenuata*, *Banksia grandis* and *B. menziesii* Woodland; *Eucalyptus marginata* and *Eucalyptus calophylla* Tall Woodland

Tamala Limestone: *Olearia axillaris*, *Rhagodia baccata*, *Alyxia buxifolia* and *Clematis microphylla* Shrubland; Open Heath to Open Low Heath dominated by *Acacia rostellifera*, *Dryandra sessilis* var. *cygnorum* and *Melaleuca acerosa*; *Banksia prionotes* Low Woodland

Wetlands (wetflats): *Casuarina obesa* Low Open Woodland; *Juncus maritimus* and *Lepidosperma gladiatum* Open Sedgeland; *Sporobolus virginicus* Very Open Grassland

Scattered Native Plants: *Eucalyptus gomphocephala* Tall Open Woodland; *Acacia cyclops* Tall Open Shrubland

Vegetation Condition: >60% Very Good, <40% Good to Degraded, with areas of severe localised disturbance (Greening WA Point Walter Group 1994)

Total Flora: 146 native taxa, 67 weeds (Keighery, GJ, 1991a, Greening WA Point Walter Group 1994, Smith, V, and Smith 1986) (estimated >80% expected flora)



Significant Flora: *Lechenaultia linarioides*; *Caladenia latifolia* (white flowers); Species of interest: one of most northerly (and possibly most easterly) occurrences of *Agonis flexuosa*, *Alyogyne huegelii* var. *glabrescens*, uncommon in PMR, *Alyxia buxifolia* (rarely recorded for the mainland, common on adjacent offshore islands and Yalgorup National Park), *Pittosporum phylliraeoides* var. *phylliraeoides* (common only on adjacent offshore islands and in Yanchep and Yalgorup National Park), *Conospermum triplinervium*; typical Tamala Limestone taxa - *Templetonia retusa* and *Grevillea preissii*; a series of species associated with the Spearwood Dunes (sands and Tamala Limestone) the occurrence of which is extended inland along the river — *Acacia lasiocarpa* var. *lasiocarpa*, *Acacia xanthina*, *Acanthocarpus preissii*, *Alyxia buxifolia*, *Conostylis candicans*, *Dryandra sessilis* var. *cygnorum*, *Eucalyptus gomphocephala*, *Grevillea vestita*, *Pittosporum phylliraeoides* var. *phylliraeoides*, *Scaevola nitida* and *Templetonia retusa*.

Fauna: limited survey by Smith, V and Smith (1986) for reptiles (8) and birds (32). Significant bird species: category 4 (1)

Other Special Attributes: is one of a very limited number of bushland areas on the Swan Estuary, naturally vegetated areas on the Swan Estuary having particular conservation value in providing habitat for fauna and linkage between areas of bushland; part open space of regional significance (DCE 1983)

Alfred Cove

Landscape Features: vegetated wetland

Vegetation and Flora: detailed survey (Keighery, GJ, 1990b); limited survey (DEP 1996 (Alfr 01-02), EPA 1987, Pen 1983)

Structural Units: mapping (Pen 1983)

Wetlands (wetflats): *Eucalyptus rudis* Forest to Woodland; *Melaleuca raphiophylla* Low Open Forest to Low Woodland; Open Low Heath dominated by *Sarcocornia quinqueflora* or *Halosarcia halocnemoides*; Closed Sedgeland to Sedgeland dominated by *Bolboschoenus caldwellii*, *Schoenus subfascicularis*, *Baumea juncea* and *Juncus kraussii*

Scattered Native Plants: *Eucalyptus rudis* Forest to Woodland, *Melaleuca raphiophylla* Low Open Forest to Low Woodland - regionally significant vegetation recognised as being included in the area of Bushplan Site in need of protection

Vegetation Condition: >75% Very Good to Excellent, <25% Good to Degraded, with areas of severe localised disturbance

Total Flora: 84 native taxa, 89 weeds (Keighery, GJ, 1990b) (estimated >90% expected flora)

Significant Flora: *Angianthus micropodioides* (3); *Burchardia bairdiae*, *Gyrostemon ramulosus* (southernmost record, only one plant remains), *Cyperus laevigatus* (only record on the Plain, possibly a weed), *Tribonanthes* aff. *violacea* (associated with freshwater seepages)

Fauna: surveyed by RAOU (1996 D), 50 visits, and EPA 1987 for birds (132 species). Important feeding area for large assemblage (30 species) and population levels of trans-equatorial wading birds protected under the JAMBA/CAMBA treaties. Important breeding place for 30 species. Significant bird species: category 1 (2), category 2 (30), category 3 (11) and category 4 (6). Significant mammal species: Quenda (Friend 1996 D)

Other Special Attributes: National Trust of Australia (WA) Classification; 'last remaining area of shoreline samphire and rush on the lower estuary' (EPA 1987); the 'Middle holocene beds are, as far as known, the last substantially undisturbed example on the Swan River, all others having been destroyed or buried by shore reclamation' (G.W. Kendrick pers. comm.); the Pt Waylen Shell Bed is the only undisturbed surface outcrop of a marine-gulf deposit of Middle Holocene age within the Swan River Estuary (Lemmon *et al.* 1979); is one of a very limited number of bushland areas on the Swan Estuary, naturally vegetated areas on the Swan Estuary having particular conservation value in providing habitat for fauna and linkage between areas of bushland; part open space of regional significance (DCE 1983)

Alfred Cove to Point Walter

Landscape Features: vegetated wetland

Vegetation and Flora: limited survey (DEP 1996)

Scattered Native Plants: *Eucalyptus rudis* Forest to Woodland, *Melaleuca raphiophylla* Low Open Forest to Low Open Woodland - regionally significant vegetation recognised as being included in the area of Bushplan Site in need of protection

Linkage: (Blackwall Reach, Point Walter, Alfred Cove and adjacent bushland) no adjacent bushland; part of proposed Greenway 24 (Tingay, Alan & Associates 1997a); part of a regionally significant contiguous bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: naturally vegetated areas on the Swan Estuary have particular conservation value in providing habitat for fauna and linkage between larger more intact areas of bushland; one of the few naturally vegetated areas on the Swan Estuary; open space of regional significance (DCE 1983)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Directory of Important Wetlands in Australia (Swan-Canning Estuary); Part Bushplan Site listed on the Register of the National Estate; Location for JAMBA/CAMBA species

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Rarity, Maintaining ecological processes or natural systems, 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 Scheduled Fauna; under MRS Parks and Recreation Reservation and TPS Landscape Zoning, Crown Reserve

Constraints: under MRS Urban Zoning

Recommendation: The existing purpose, care, control and management of Reserves 35066, 44414 is endorsed. For the remainder of the Bushplan Site — 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.

POINT HEATHCOTE FORESHORE, APPLECROSS

Boundary Definition: protected area boundary (Areas of bushland/native vegetation within the boundaries of the Bushplan Site are not accurately mapped.)

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 329 **Map no.** 61 **Map sheet series ref. no.** 2033-I NW

System 6 (1983): M65 part System area bushland and part scattered native plants (canopy), all vegetation described

Other Names: not known

Area (ha): total 1.6; bushland 0 (note comment under Boundary Definition)

Local Authorities (Suburb)
City of Melville (Applecross)

Zoning
MRS: Parks and Recreation
TPS: Landscape

Ownership Categories
Private (commercial organisation); State Government

Lot/Location/Reserve numbers (Purpose), Street name
6854 Canning Beach Rd; 8371 The Strand
Crown Reserve

SECTION 2: REGIONAL INFORMATION
LANDFORMS AND SOILS

Pinjarra Plain

Guildford Formation (Qha: S14)

Spearwood Dunes

Tamala Limestone (Qtl: LS1)

VEGETATION AND FLORA

Vegetation Complex

Spearwood Dunes

Karrakatta Complex — Central and South

Floristic Community Types: not sampled, types not inferred

WETLANDS

Wetland Types: estuary (waterbody)

Natural Wetland Groups

Estuaries

Swan River (E.2)

Wetland Management Objectives: Conservation (0.1ha)

Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Not determined

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: estuary — limestone cliff, vegetated wetland

Vegetation and Flora: detailed survey (Keighery, GJ, and Keighery 1998)

Structural Units

Wetlands (wetflats): *Juncus kraussii* and *Isolepis nodosus* Sedgeland



Scattered Native Plants

Uplands (slopes) – Spearwood Dunes: *Banksia* Low Woodland but generally modified, few scattered native plants and plantings

Vegetation Condition: Degraded to Completely Degraded

Total Flora: 87 native taxa, 36 weeds (Keighery, GJ, and Keighery 1998) (estimated >90% expected flora)

Significant Flora: Keighery, GJ, and Keighery 1998 — *Conospermum triplinervium*; a series of species associated with the Spearwood Dunes (sands and Tamala Limestone) the occurrence of which is extended inland along the river — *Conostylis candidans*, *Dryandra sessilis* var. *cygnorum*, *Eucalyptus gomphocephala*, *Scaevola nitida* and *Templetonia retusa*

Fauna: no known information

Linkage: adjacent vegetation surrounding Heathcote Hospital available; part of proposed Greenway 24 (Tingay, Alan & Associates 1997a); part of a regionally significant contiguous bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: naturally vegetated areas on the Swan Estuary have particular conservation value in providing habitat for fauna and linkage between larger more intact areas of bushland; one of the few naturally vegetated areas on the Swan Estuary; open space of regional significance (DCE 1983)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Directory of Important Wetlands in Australia (Swan-Canning Estuary)

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: 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

Opportunities and/or Constraints

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

Constraints: private land

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 be enhanced by: amending the purpose of the reserve to include conservation; and applying appropriate mechanisms in consultation with the reserve management body.

YAGAN WETLAND AND ADJACENT BUSHLAND, ROSSMOYNE TO BULL CREEK

Boundary Definition: protected area/bushland (part taken to zoning)/bushland group boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 338

Map no: 61

Map sheet series ref. no: 2033-I NW

System 6 (1983): M74 area of bushland goes beyond System area boundaries, all bushland described

Other Names

Bull Creek

Area (ha): total 25.2; bushland 16.7

Local Authorities (Suburb)

City of Melville (Brentwood, Bull Creek), City of Canning (Rossmoyne, Brentwood)

Zoning

MRS: Parks and Recreation, Urban, Waterways, Controlled Access Highways

TPS: Landscape, Local Open Space, Private Clubs and Institutions, Public Use Reserve

Ownership Categories

State Government

Lot/Location/Reserve numbers (Purpose), Street name

1773, 2429 Camm Ave; 3, 2145, 2337, 2429, 2430, 2431, 2435, 2446, 2535 Leach Hwy
Crown Reserve

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Pinjarra Plain

Guildford Formation (Qha: C1)

Bassendean Dunes

Bassendean Sands (Qpb: S8)

Spearwood Dunes

Sands derived from Tamala Limestone (Qts: S7)



VEGETATION AND FLORA

Vegetation Complex

Bassendean Dunes

Bassendean Complex — Central and South

Floristic Community Types: *not sampled, type not inferred

Supergroup 2: Seasonal Wetlands

*16 Highly saline seasonal wetlands

*S7 Northern woodlands to forests over tall sedgeland alongside permanent wetlands

WETLANDS

Wetland Types: floodplain, sumpland, artificial channel, estuary (shoreline and peripheral), estuary (waterbody)

Natural Wetland Groups

Estuaries

Swan River (E.2)

Wetland Management Objectives: Conservation (13.7ha)

Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Not assessed, Not determined

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated uplands, vegetated wetlands, estuary

Vegetation and Flora: detailed survey (Brooker 1995, Smith, P 1987); limited survey (DEP 1996)

Structural Units: mapping (Brooker 1995, Smith, P 1987)

Wetlands (wetflats): *Eucalyptus rudis* Forest; *Melaleuca raphiophylla* Low Forest; Closed Sedgeland dominated by *Juncus kraussii*, *Gahnia trifida* and *Baumea articulata*

Scattered Native Plants: *Eucalyptus rudis* Open Woodland to Woodland, few scattered native plants and plantings

Vegetation Condition: >75% Very Good to Excellent, <25% Good to Degraded, with areas of severe localised disturbance

Total Flora: 49 native taxa, 48 weeds (P. Matthews in Brooker 1995) (estimated >90% expected flora)

Significant Flora: none identified

Fauna: limited survey for birds (58), reptiles (12) and amphibians (6) (Smith 1987 and Brooker 1995). Significant bird species: category 1 (1), category 3 (6) and category 4 (4). Significant reptile species: Swamp Skink (*Acritoscincus trilineatum*) and Mourning Skink (*Egernia luctuosa*)

Linkage: no adjacent bushland; part of proposed Greenway 94 (Tingay, Alan & Associates 1997a); part of a regionally significant contiguous bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: 'area of considerable conservation and landscape value' (Swan River Trust 1994); is one of a very limited number of bushland areas on the Canning Estuary, naturally vegetated areas on the Canning Estuary having particular conservation value in providing habitat for fauna and linkage between areas of bushland; open space of regional significance (DCE 1983)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Directory of Important Wetlands in Australia

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Rarity, 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

Opportunities and/or Constraints

Opportunities: Bushplan Site/part Bushplan Site subject to Swan and Canning Rivers EPP; location of Scheduled Fauna; conservation category wetlands; under MRS Parks and Recreation Reservation and TPS Landscape Zoning, Local Open Space Zoning and Public Use Reserve Zoning, Crown Reserve

Constraints: under MRS Urban Zoning, MRD regional road requirements

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s). This may include — 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.

MOUNT HENRY BUSHLAND, SALTER POINT

Boundary Definition: protected area/management boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 227 **Map no.** 61 **Map sheet series ref. no.** 2033-I NW
System 6 (1983): M66 area of bushland goes beyond System area boundaries, all bushland described

Other Names: not known

Area (ha): total 21.5; bushland 11.9

Local Authorities (Suburb)

Zoning

City of South Perth (Salter Point, Como)

MRS: Parks and Recreation, Urban, Controlled Access
 Highways, Waterways

TPS: Landscape, Private Institutions

Ownership Categories

State Government, Private (commercial organisation)

Lot/Location/Reserve numbers (Purpose),

Street name

974 Canning Pde; 9, 4130 Kwinana Fwy

Crown Reserve

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Pinjarra Plain

Guildford Formation (Qha: S14)

Spearwood Dunes

Sands derived from Tamala Limestone (Qts: S7)

Tamala Limestone (Qtl: LS1)

VEGETATION AND FLORA

Vegetation Complex

Bassendean Dunes

Bassendean Complex — Central and South

Floristic Community Types: *not sampled, type inferred

Supergroup 2: Seasonal Wetlands

*16 Highly saline seasonal wetlands

*S7 Northern woodlands to forests over tall sedgeland alongside permanent wetlands

Supergroup 4: Uplands centred on Spearwood and Quindalup Dunes

*28 Spearwood *Banksia attenuata* or *B. attenuata* — *Eucalyptus* woodlands

30a2 Woodlands and shrublands on Holocene dunes (re-allocated from 30c)

WETLANDS

Wetland Types: estuary (waterbody)

Natural Wetland Groups

Estuaries

Swan River (E.2)

Wetland Management Objectives: Conservation (3.2ha)

Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Not assessed, Not determined

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: estuary — sandy bluff, vegetated uplands, vegetated wetlands

Vegetation and Flora: detailed survey (Brooker *et al.* 1993b); limited survey (Gibson *et al.* 1994 (MHenry 01-02))

Structural Units: mapping (Brooker *et al.* 1993b)

Uplands (Sands derived from Tamala Limestone/Tamala Limestones not distinguished): Scattered *Eucalyptus gomphocephala* over Open Heath to Closed Tall Scrub dominated by *Spyridium globulosum*, *Dryandra sessilis* var. *cygnorum*, *Templetonia retusa* and *Dodonaea hackettiana*; *Banksia attenuata* and *B. menziesii* Low Woodland

Wetlands: Low Woodland dominated by *Casuarina obesa* and/or *Melaleuca cuticularis*; Low Woodland dominated by *Melaleuca raphiophylla* or *M. preissiana*; *Juncus kraussii* Sedgeland

Scattered Native Plants: not assessed

Vegetation Condition: >60% Excellent to Very Good, <40% Good to Degraded, with areas of severe localised disturbance

Total Flora: 132 native taxa, 60 weeds (Brooker *et al.* 1993b) (estimated >90% expected flora)

Significant Flora: *Dodonaea hackettiana* (4); *Astroloma macrocalyx*, *Hovea chorizemifolia* (disjunct distribution, Brooker *et al.* 1993b); a number of species associated with the Spearwood Dunes are generally at their most inland point on the Plain — *Acacia lasiocarpa* var. *lasiocarpa*, *Acanthocarpus preissii*, *Adriana quadripartita*, *Anthocercis littorea*, *Conostylis candicans*, *Dodonaea aptera*, *Dryandra sessilis* var. *cygnorum*, *Eucalyptus gomphocephala*, *Spyridium globulosum* and *Templetonia retusa*

Fauna: multiple and structured surveys by Western Australian Museum of Natural Science for birds (37), native mammals (1), reptiles (11) and amphibians (2) (How *et al.* 1996 and Brooker *et al.* 1993). Significant populations of Golden Whistler, a large assemblage of honeyeaters and a feeding area for Carnaby's Cockatoo. Significant bird species: category 1 (1), category 3 (1) and category 4 (3). Significant reptile species: Lined Skink (*Lerista lineata*)

Linkage: adjacent bushland canopy to the north and east (BS333); part of proposed Greenway 94 (Tingay, Alan & Associates 1997a); part of a regionally significant contiguous bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: most inland vegetated knoll and area of Spearwood Dunes on the Swan-Canning Estuary; 'area of considerable conservation and landscape value' (Swan River Trust 1994); one of a very limited number of bushland areas on the Canning Estuary, naturally vegetated areas on the Canning Estuary having particular conservation value in providing habitat for fauna and linkage between areas of bushland; open space of regional significance (DCE 1983)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Directory of Important Wetlands in Australia; Listed on the Register of the National Estate

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Rarity, Maintaining ecological processes or natural systems, 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

Opportunities and/or Constraints

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

Constraints: private land; under MRS Urban Zoning, 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.

CANNING RIVER FORESHORE, SALTER POINT TO WILSON

Boundary Definition: protected area boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 333 **Map no.** 61, 62 **Map sheet series ref. no.** 2033-I NE, 2033-I NW
System 6 (1983): M67 area of bushland goes beyond System area boundaries, all bushland described

Other Names

Submission Area 177

Local Authorities (Suburb)

City of South Perth (Salter Point, Waterford, Manning),
City of Canning (Wilson)

Ownership Categories

Private (commercial organisation), State Government,
Local Government

Area (ha): total 34.8; bushland 17.9

Zoning

MRS: Parks and Recreation, Urban, Waterways
TPS: Landscape, Residential R, Private Institutions,
Park and Recreational Area

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

57, 58 Manning Rd; 3318, 3976 Elderfield Rd; 389
Waterford Ave; 1279, 1943, 3607 Salter Point Pde; 2080
River Way; 17 Waterford Ave; 4190 street not identified
Crown Reserve

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Spearwood Dunes

Sands derived from Tamala Limestone (Qts: S7)

Tamala Limestone (QtI: LS1)

Pinjarra Plain

Guildford Formation (Qha: S14)

VEGETATION AND FLORA

Vegetation Complex

Bassendean Dunes

Bassendean Complex — Central and South



Floristic Community Types: *not sampled, type inferred

Supergroup 2: Seasonal Wetlands

16 Highly saline seasonal wetlands

*S7 Northern woodlands to forests over tall sedgelands alongside permanent wetlands

WETLANDS

Wetland Types: estuary (shoreline and peripheral), estuary (waterbody), lake, artificial channel

Natural Wetland Groups

Bassendean Dunes

Jandakot (B.3)

Estuaries

Swan River (E.2)

Wetland Management Objectives: Conservation (25.9ha)

Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Not assessed, Not determined

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated wetland, river, estuary, vegetated uplands

Vegetation and Flora: detailed survey (Brooker *et al.* 1993a, 1994a&b, Orr 1986 and 1987); limited survey (Gibson *et al.* 1994 (Sandon 01), Pen 1983)

Structural Units: mapping (Brooker *et al.* 1993a, 1994a&b, Pen 1983)

Wetlands (wetflats): *Eucalyptus rudis* Woodland to Forest; Open Forest to Low Open Forest dominated by *Casuarina obesa*, *Melaleuca raphiophylla* and/or *M. preissiana*; *Acacia saligna* Low Woodland; *Sarcocornia quinqueflora* Open Low Heath to Low Shrubland; *Juncus kraussii* Sedgeland to Closed Sedgeland; *Baumea juncea* Sedgeland

Scattered Native Plants: not assessed

Vegetation Condition: >50% Very Good to Excellent, <50% Good to Degraded, with areas of severe localised disturbance

Total Flora: approximately 90 native taxa (compiled from Orr 1986, 1987, Brooker *et al.* 1993a, 1994a&b) (estimated >75% expected flora)

Significant Flora: *Aotus cordifolia* (3) (Orr 1986)

Fauna: limited surveys for birds (74), reptiles (12) and amphibians (6) (Brooker *et al.* 1993a, 1994a, 1994b). Significant bird species: category 1 (1), category 2 (3), category 3 (6) and category 4 (4)

Linkage: adjacent bushland canopy to the north and west (BS227); part of proposed Greenway 94 (Tingay, Alan & Associates 1997a); part of a regionally significant contiguous bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: 'area of considerable conservation and landscape value' (Swan River Trust 1994); bushland/naturally vegetated estuarine areas have particular conservation value in providing habitat for fauna and linkage between larger more intact areas of bushland; contains open space of regional significance (DCE 1983)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Directory of Important Wetlands in Australia (Swan-Canning Estuary); Listed on the Register of the National Estate; Location for JAMBA/CAMBA species

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Rarity, 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

Opportunities and/or Constraints

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

Constraints: private land; under MRS Urban Zoning

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s).

**CANNING RIVER REGIONAL PARK AND ADJACENT BUSHLAND,
RIVERTON TO LANGFORD**

Boundary Definition: protected area/bushland taken to zoning and cadastre boundary (Areas of bushland/native vegetation within the boundaries of the Bushplan Site are not accurately mapped.)

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 224 **Map no.** 62, 63 **Map sheet series ref. no.** 2033-I NE

System 6 (1983): M68, part M75 area of bushland goes beyond System area boundaries, all bushland described

Other Names: not known

Local Authorities (Suburb)

City of Canning (Wilson, Cannington, Langford, Ferndale), City of Gosnells (Beckenham)

Ownership Categories

Local Government, State Government, Private (including commercial organisation), Not identified

Area (ha): total 379.1 (includes open water); bushland 161.2

Zoning

MRS: Urban, Waterways, Parks and Recreation, Important Regional Roads

TPS: Landscape, Local Park and Recreation Area, Public Purposes, Residential, Residential A, Rural, Special Use

Lot/Location/Reserve numbers (Purpose), Street name

1, 2, 3, 4, 7, 31, 32, 33, 62, 63, 64 Fern Rd; 0, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 26, 25, 27, 28, 29, 30 Queens Park Rd; 5, 6, Kent St; 21, 22, 23, 24, 25, 26, 3431, 3447 Wharf St; 58, 100 Mason St; 15, 16, 17 Rupert St; 13, 14, 18, 19 Greenfield St; 12 Richmond St; 0, 1, 2, 3, 15, 100, 101, 925, 1786 Nicholson Rd; 2, 3, 4, 16 Spencer Rd; 139, 141, 150, 2588, 2784, 2969 Ellison Dr; 3559, 3826 Machin Pl; 55, 502 Hester St; 6, 7, 43, 70, 71, 358, 259, 360, 361, 362, 367 Wimbleton St; 0, 1, 2, 7, 11 Harris St; 1, 2, 500 Packer St; 2023, 2758, 3412 Highbury Cr; 0, 2, 48, 49, 1572 Lofoten Wy; 62 Willcock St; 0, 2, Marmot Way; 1201 Hybanthus Rd; 1974; 70, 2530, 3833 Bywater Way; 12, 923 Ferndale Cr; 9, 10, 11, 41, 314, 500, 933 Ferndale Cr; 1 Duff Rd; 0, 4, 5, 42, 44, 1744 Champlin Way; 31, 47 Liseron Wy; 30 Lofoten Wy; 102, 500 Watts Rd; 1, 2, 5, 9, 10, 75, 98, 100, 101, 103, 181, 500, 501, 701, 703 Surrey Rd; 3753 Hollis Rd; 5 Eastfield Ct; 3, 1988 Bridgeway Ave; 61 Camsell Wy; 20, 21, 35, 36 Greenfield St; 23, 24, 25, 26, 27, 40, 46, 47, 48, 49, 50, 700, 3692 Marriamup St; 32, 33 Cockram St; 1, 43 River Rd; 3, 14, 15, 16, 42, 43, 50, 200, 205, 2090 Woodloes St; 990, 1616 Riverton Dr; 1616 Barbican St; 3785, 4040 Vervain Wy; 52, 199, 920, 921 Riley Rd; 202 Rivermoor Loop; 0, 199, 201, 275 Adenia Rd; 2, 2575, 2596 Metcalfe Rd; 5 Merino Ct; 69, 2815, 2816 Latimer Wy; 500 Hester St; 2575 Jaccard Wy; 1, 2630 Iveson Rd; 701, 702 Bradford St; 0, 924, 2882, 2885, 4089 street not identified; Road
Crown Reserve

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Pinjarra Plain

Guildford Formation (Qpa: Cs) (Qha: Msp, Msc1)

Bassendean Dunes

Bassendean Sands (Qpb: S8)

Bassendean Dunes/Pinjarra Plain

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

Wetlands (within the Bassendean Dunes)

Holocene Swamp Deposits (Qrw: Sp2)

VEGETATION AND FLORA

Vegetation Complex

Pinjarra Plain

Guildford Complex

Swan Complex

Bassendean Dunes

Bassendean Complex - Central and South

Combinations of Bassendean Dunes/Pinjarra Plain

Southern River Complex

Floristic Community Types: not sampled, types not inferred



WETLANDS

Wetland Types: sumpland, floodplain, palusplain, river, creek, artificial channel, estuary (waterbody), estuary (shoreline and peripheral)

Natural Wetland Groups

Bassendean—Pinjarra transition OR Bassendean with fluvial features

Bennet Brook (B/P.4)

Swan Coastal Plain Rivers

Swan River (R.2)

Estuaries

Swan River (E.2)

Wetland Management Objectives: Conservation (258.5ha, 545m), Resource Enhancement, Multiple Use

Swan Coastal Plain Lakes EPP: 32.1ha

THREATENED ECOLOGICAL COMMUNITIES

Not determined

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: open water, vegetated wetland, creek, river, estuary, island, vegetated uplands

Vegetation and Flora: detailed survey (Brock and Pen 1984, State Planning Commission 1989); limited survey (CALM *et al.* 1997, Connell 1995, Pen 1983)

Structural Units: mapping (State Planning Commission 1989, Brock and Pen 1984)

Uplands: Scattered *Banksia menziesii*, *B. attenuata* and *Eucalyptus marginata* Low Woodland over Mixed Shrublands of *Acacia stenoptera*, *A. saligna*, *Jacksonia furcellata* and *J. sternbergiana*

Wetlands (wetflats): *Eucalyptus rudis* and *Melaleuca raphiophylla* Low Woodland to Closed Forest; *Eucalyptus rudis* Woodland to Open Forest; *Casuarina obesa* and *Melaleuca raphiophylla* Woodland; *Melaleuca raphiophylla* Woodland; Open Low Heath to closed Heath dominated by *Sarcocornia quinqueflora* or *Halosarcia* species with occasional sedges of *Bolboschoenus caldwellii*; Sedgeland dominated by *Juncus kraussii*, *Samolus repens*, *Baumea juncea* or *Typha domingensis*

Scattered Native Plants: *Eucalyptus rudis* Open Woodland; *Melaleuca raphiophylla* Open Woodland; *Eucalyptus rudis* and *Melaleuca raphiophylla* Open Woodland

Vegetation Condition: varies from patches in Excellent Condition to Completely Degraded

Total Flora: 96 native taxa, 58 introduced taxa (Brock and Pen 1984) (estimated <50% of expected flora)

Significant Flora: none recorded

Fauna: surveyed by RAOU (1996 D), several visits, and Brock and Pen (1984) for birds (97) and Brock and Pen (1984) for fish (35). Important feeding area for large assemblage of waterbirds and wading birds. Significant bird species: category 1 (6), category 2 (2), category 3 (5) and category 4 (2). Significant mammal species: Quenda (Friend 1996 D)

Linkage: no adjacent bushland; part of proposed Greenway 94, 87 (Tingay, Alan & Associates 1997a); part of a regionally significant contiguous bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: National Trust of Australia (WA) Classification; bushland/naturally vegetated estuarine/riverine areas have particular conservation value in providing habitat for fauna and linkage between larger more intact areas of bushland; contains open space of regional significance (DCE 1983); part Bushplan Site included in Canning River Regional Park (CALM *et al.* 1997); contains 1181m of regionally significant river (WRC 1996a GIS)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Directory of Important Wetlands in Australia; Listed on the Register of the National Estate; Location for JAMBA/CAMBA species

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Rarity, 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

Opportunities and/or Constraints

Opportunities: Bushplan Site/part Bushplan Site subject to Swan Coastal Plain Lakes EPP, Swan and Canning Rivers EPP; location of Scheduled Fauna, conservation category wetlands; under MRS Parks and Recreation Reservation, TPS Landscape Zoning and Local Park and Recreation Area Zoning, Crown Reserve

Constraints: private land; under MRS Urban Zoning, MRD regional road requirements

Recommendation: The care, control and management of parts of this Bushplan Site for conservation purposes within Canning River Regional Park is endorsed. The most appropriate mechanism for the protection of the remainder of this Bushplan Site to be considered through the public comment period in consultation with the land owner(s).



CANNING AND SOUTHERN RIVERS, BECKENHAM TO MARTIN/KELMSCOTT

Boundary Definition: protected area boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 246 **Map no.** 63, 69, 70 **Map sheet series ref. no.** 2033-I NE, 2133-IV NW

System 6 (1983): Part M75 area of bushland goes beyond System area boundaries, all bushland described

Other Names: not known

Local Authorities (Suburb)

City of Gosnells (Gosnells, Southern River, Huntingdale,

Thornlie, Maddington, Beckenham, Kenwick, Martin),

City of Armadale (Kelmescott)

Area (ha): total 350.4; bushland 181.1

Zoning

MRS: Urban, Rural, Waterways, Parks and Recreation, Railways, Controlled Access Highways, Other Major Highways, Important Regional Roads, Public Purposes-Technical School

TPS: Deferred Urban, Landscape, Parks and Recreation, Public Purposes, Residential, Residential A, Residential B, Rural, Special Site, Special Use, Water Courses

Lot/Location/Reserve numbers (Purpose),

Street name

(Riverine and creekline lots not identified)

Crown Reserve

Ownership Categories

State Government, Local Government, Private (including commercial organisation)

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Foothills

Colluvial Deposits (Qc: Csg)

Yoganup Formation (Qpr: S12)

Pinjarra Plain

Guildford Formation (Qpa: Cs) (Qha: Cms, Msc1, Ms4)

Alluvial/Colluvial Deposits (Qha/Qc: G1/FS3) (Qa: FS1)

Bassendean Dunes

Bassendean Sands (Qpb: S8)

Bassendean Dunes/Pinjarra Plain

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

VEGETATION AND FLORA

Vegetation Complex

Foothills

Forrestfield Complex (Ridge Hill Shelf, Darling Plateau)

Pinjarra Plain

Guildford Complex

Swan Complex

Combinations of Bassendean Dunes/Pinjarra Plain/Spearwood Dunes

Southern River Complex

Floristic Community Types: not sampled, types not inferred.

WETLANDS

Wetland Types: dampland, floodplain, palusplain, river, creek, artificial channel

Natural Wetland Groups

Bassendean—Pinjarra transition OR Bassendean with fluvial features

Bennet Brook (B/P.4)

Swan Coastal Plain Rivers

Swan River (R.2)

Wetland Management Objectives: Conservation (149.2ha, 215m), Resource Enhancement

Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Not determined

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated wetland, creek, river, vegetated uplands

Vegetation and Flora: limited survey (Connell 1995, Main Roads 1993, Payne 1993b, Pen 1983, 1993)

Structural Units: mapping (Pen 1983, 1993)

Uplands: Low Open Forest dominated by *Banksia attenuata*, *B. menziesii*, *B. ilicifolia*, *Allocasuarina fraseriana*, *Eucalyptus tottiana* and combinations of these

Wetlands (wetflats): *Eucalyptus rudis* and *Melaleuca raphiophylla* Open to Closed Forest over *Astartea fascicularis* and *Grevillea diversifolia*; *Eucalyptus calophylla* Open to Closed Forest; *Eucalyptus rudis* and *E calophylla* Open to Closed Forest

Scattered Native Plants: *Eucalyptus rudis* Open Woodland to Woodland, *Eucalyptus calophylla* Open Woodland to Woodland — regionally significant vegetation recognised as being included in the area of Bushplan Site in need of protection

Vegetation Condition: varies from patches in Excellent Condition to Completely Degraded

Total Flora: not known

Significant Flora: none recorded

Fauna: no systematic survey. Significant mammal species: Quenda (Friend 1996 D)

Linkage: adjacent bushland/canopy to the east (BS61); part of proposed Greenway 86, 87 (Tingay, Alan & Associates 1997a); part of a regionally significant contiguous bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: National Trust of Australia (WA) Classification; bushland/naturally vegetated watercourses have particular conservation value in providing habitat for fauna and linkage between larger, more intact areas of bushland; contains open space of regional significance (DCE 1983); contains 1963m of regionally significant river (WRC 1996a GIS)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Rarity, 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

Opportunities and/or Constraints

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

Constraints: private land; under MRS Urban Zoning, MRD regional road requirements

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s). This may include parts for which: The existing care, control and management intent of the reserve is endorsed. Long-term security and support for conservation management of the Bushplan Site be enhanced by: amending the purpose of the reserve to include conservation; and applying appropriate mechanisms in consultation with the reserve management body.

DALLEN ROAD BUSHLAND, SOUTHERN RIVER/GOSNELLS

Boundary Definition: bushland boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 255 **Map no.** 69 **Map sheet series ref. no.** 2033-I NE

System 6 (1983): Part M75 area of bushland goes beyond System area boundaries, all bushland described

Other Names: not known **Area (ha):** total 26.9; bushland 26.9

Local Authorities (Suburb)

Zoning

City of Gosnells (Gosnells)

MRS: Urban Deferred, Waterways, Parks and Recreation

TPS: Rural, Landscape

Ownership Categories

Lot/Location/Reserve numbers (Purpose),

Private (commercial organisation), Not identified

Street name

16 Dallen St; 101 Seaforth Ave

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Pinjarra Plain

Guildford Formation (Qpa: Cs)

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: not sampled, types not inferred

WETLANDS

Wetland Types: dampland, creek, artificial channel, river

Natural Wetland Groups

Bassendean—Pinjarra transition OR Bassendean with fluvial features

Bennett Brook (B/P.4)

Wetland Management Objectives: Conservation (17.1ha)

Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Not determined

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated wetland, creek, vegetated uplands

Vegetation and Flora: limited survey (Connell 1995, Matiske Consulting Pty Ltd 1997, Pen 1993)

Structural Units: mapping (Pen 1993) part Bushplan Site

Uplands: not known

Wetlands: *Melaleuca raphiophylla* Low Open to Closed Forest; *Eucalyptus rudis* and *Melaleuca raphiophylla* Open to Closed Forest over *Astartea fascicularis*; *Eucalyptus calophylla* Woodland; Open Heath dominated by species of *Kunzea*, *Verticordia* and *Melaleuca*

Scattered Native Plants: *Eucalyptus rudis* and *E. calophylla* Woodland

Vegetation Condition: varies from a few patches in Very Good Condition to Degraded and Completely Degraded

Total Flora: not known

Significant Flora: none recorded

Fauna: No systematic survey. Significant mammal species: Quenda (Friend 1996 D)

Linkage: adjacent bushland/canopy along the Southern River to BS464/BS246 in the north and south to BS260; part of proposed Greenway 86 (Tingay, Alan & Associates 1997a); part of a regionally significant fragmented bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: Category One Area Middle Canning Catchment Study (Evangelisti & Associates *et al.* 1995), one of only two large areas of bushland on the Southern River (BS255 and BS464); naturally vegetated estuarine/riverine areas have particular conservation value in providing habitat for fauna and linkage between larger, more intact areas of bushland; contains 864m of regionally significant river (WRC 1996a GIS)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Rarity, 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 conservation wetlands; under MRS Parks and Recreation Reservation and TPS Landscape Zoning

Constraints: private land; under MRS Urban Deferred Zoning

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s).

SOUTHERN RIVER AND ADJOINING BUSHLAND, WESTFIELD

Boundary Definition: protected area/bushland boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 260

Map no. 69

Map sheet series ref. no. 2033-I NE

Other Names: not known

Area (ha): total 9.0; bushland 7.2

Local Authorities (Suburb)

Zoning

City of Armadale (Armadale, Westfield)

MRS: Parks and Recreation, Important Regional Roads

TPS: Landscape, Rural

Ownership Categories

Lot/Location/Reserve numbers (Purpose),

State Government, Private (including commercial organisation)

Street name

(Riverine lots not identified)

Crown Reserve



SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Pinjarra Plain

Guildford Formation (Qpa: Cs)

Bassendean Dunes

Bassendean Sands (Qpb: S8)

Bassendean Dunes/Pinjarra Plain

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

VEGETATION AND FLORA

Vegetation Complex

Combinations of Bassendean Dunes/Pinjarra Plain

Southern River Complex

Floristic Community Types: not sampled, types not inferred

WETLANDS

Wetland Types: dampland, river, artificial channel

Natural Wetland Groups

Bassendean—Pinjarra transition OR Bassendean with fluvial features

Bennet Brook (B/P.4)

Wetland Management Objectives: Conservation (5.8ha), Resource Enhancement

Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Not determined

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated wetland, river, vegetated uplands

Vegetation and Flora: aerial photograph interpretation

Structural Units

Wetlands: *Eucalyptus rudis* Woodland to Forest; *Eucalyptus calophylla* Woodland; *Melaleuca raphiophylla* Low Forest to Low Woodland

Scattered Native Plants: not assessed

Vegetation Condition: apparently varies from a few patches in Excellent Condition with an understorey of sedges and shrubs to Completely Degraded with a pasture/weed understorey

Total Flora: not known

Significant Flora: none recorded

Fauna: no known information

Linkage: no adjacent bushland; part of proposed Greenway 86 (Tingay, Alan & Associates 1997a); part of a regionally significant fragmented bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: bushland/naturally vegetated watercourses have particular conservation value in providing habitat for fauna and linkage between larger, more intact areas of bushland; contains 937m of regionally significant river (WRC 1996a GIS)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Maintaining ecological processes or natural systems, 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

Opportunities and/or Constraints

Opportunities: Bushplan Site/part Bushplan Site subject to Swan and Canning Rivers EPP; location of 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 most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s).

WUNGONG BROOK, BYFORD

Boundary Definition: protected area/bushland/conservation wetland boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 266 **Map no.** 76, 83, 84 **Map sheet series ref. no.** 2033-I SE, 2133-IV SW



Other Names: not known
Local Authorities (Suburb)
 Shire of Serpentine-Jarrahdale (Darling Downs, Brookdale)
Ownership Categories
 Private (including commercial organisation), State Government, Not identified

Area (ha): total 26.2; bushland 9.9
Zoning
MRS: Rural, Parks and Recreation, Railways
TPS: General Rural, Landscape, Parks and Recreation, Public Open Space, Rural, Special Rural
Lot/Location/Reserve numbers (Purpose), Street name
 (Riverine and creekline lots not identified)
 12, 13 South Western Hwy; 15, 3626 Wungong South Rd
 Crown Reserve

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Pinjarra Plain
 Guildford Formation (Qpa: Cs) (Qha: Msc1)
Bassendean Dunes
 Bassendean Sands (Qpb: S8)

VEGETATION AND FLORA

Vegetation Complex
Pinjarra Plain
 Guildford Complex
Floristic Community Types: not sampled, types not inferred

WETLANDS

Wetland Types: palusplain, river, creek, artificial channel
Natural Wetland Groups
Pinjarra Plain
 Keysbrook (P.1)

Wetland Management Objectives: Conservation (15.3ha, 64m), Multiple Use
Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Not determined

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: creek, vegetated wetlands
Vegetation and Flora: limited survey (Connell 1995); aerial photograph interpretation

Structural Units

Wetlands: *Eucalyptus rudis* Woodland to Forest; *Eucalyptus calophylla* and/or *Eucalyptus wandoo* Woodland; *Melaleuca raphiophylla* Low Forest to Low Woodland

Scattered Native Plants: not assessed

Vegetation Condition: varies from patches in Excellent Condition with an understorey of sedges and shrubs to Completely Degraded with a pasture/weed understorey

Total Flora: not known

Significant Flora: none recorded

Fauna: no known information

Linkage: adjacent bushland to the west; part of proposed Greenways 86, 135 (Tingay, Alan & Associates 1997a); part of a regionally significant fragmented bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: bushland/naturally vegetated watercourses have particular conservation value in providing habitat for fauna and linkage between larger, more intact areas of bushland; contains 1667m of regionally significant river (WRC 1996a GIS)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, 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

Opportunities and/or Constraints

Opportunities: Bushplan Site/part Bushplan Site subject to Peel-Harvey Estuary EPP/SPP, Swan and Canning Rivers EPP; location of conservation category wetlands; under MRS Parks and Recreation Reservation and TPS Landscape Zoning, Public Open Space Zoning and Parks and Recreation Zoning, Crown Reserve
Constraints: private land; under General Mineral Resource Area (clay and shale)



Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s).

SERPENTINE RIVER, PEEL ESTATE TO SERPENTINE

Boundary Definition: bushland boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 371 **Map no.** 95, 96 **Map sheet series ref. no.** 2033-II NE

System 6 (1983): Part M105 part System area bushland and part scattered native plants (canopy), all vegetation described

Other Names: not known

Area (ha): total 87.8; bushland 86.4

Local Authorities (Suburb)

Zoning

Shire of Serpentine-Jarrahdale (Serpentine, Mardella)

MRS: Rural, Railways, Other Major Highways

TPS: Landscape, Public Open Space, Drainage

Purposes, Public and Community Purposes, Rural

Lot/Location/Reserve numbers (Purpose),

Street name

Ownership Categories

Private (including commercial organisation), State

Government, Not identified

(Riverine and creekline lots not identified)

1322 Lowlands Rd; 71, 143 Summerfield Rd

Crown Reserve

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Foothills

Colluvial Deposits (Qc: Csg)

Pinjarra Plain

Guildford Formation (Qpa: Cs) (Qha: Msc1)

Bassendean Dunes

Bassendean Sands (Qpb: S8)

Bassendean Dunes/Pinjarra Plain

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

VEGETATION AND FLORA

Vegetation Complex

Foothills

Forrestfield Complex (Ridge Hill Shelf, Darling Plateau)

Pinjarra Plain

Guildford Complex

Bassendean Dunes

Bassendean Complex — Central and South

Combinations of Bassendean Dunes/Pinjarra Plain

Southern River Complex

Floristic Community Types: not sampled, types not inferred

WETLANDS

Wetland Types: dampland, palusplain, creek, artificial channel, river

Natural Wetland Groups

Bassendean—Pinjarra transition OR Bassendean with fluvial features

Bennet Brook (B/P.4)

Swan Coastal Plain Rivers

Goegrup (R.4)

Wetland Management Objectives: Conservation (53.1ha, 33m), Resource Enhancement, Multiple Use

Swan Coastal Plain Lakes EPP: none identified

THREATENED ECOLOGICAL COMMUNITIES

Not determined

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: vegetated wetland, creek, river, vegetated uplands

Vegetation and Flora: detailed survey (Chambers and Pen 1985, Siemon *et al.* 1993); limited survey (Mattiske Consulting Pty Ltd 1997, Connell 1995)

Structural Units: mapping (Siemon *et al.* 1993, Chambers and Pen 1985)

Wetlands: *Eucalyptus rudis* and *Melaleuca raphiophylla* Woodland; *Eucalyptus rudis* Open Forest; Closed Sedgeland dominated by *Juncus kraussii*, *J. microcephalus* and *Isolepis nodosa*



Scattered Native Plants: not assessed

Vegetation Condition: varies from patches in Excellent Condition with an understorey of sedges and shrubs to Completely Degraded with a pasture/weed understorey

Total Flora: not known

Significant Flora: none recorded

Fauna: no known information

Linkage: adjacent bushland to the south (BS365) and east (BS368); part of proposed Greenways 81, 120 (Tingay, Alan & Associates 1997a); part of a regionally significant fragmented bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: Contains plant communities representative of the eastern side of the Swan Coastal Plain; National Trust of Australia (WA) Classification; bushland/naturally vegetated watercourses have particular conservation value in providing habitat for fauna and linkage between larger, more intact areas of bushland; contains regionally significant river (WRC 1996a GIS)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, 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 Peel-Harvey Estuary EPP/SPP; location of conservation category wetlands; under TPS Landscape Zoning and Public Open Space Zoning, Crown Reserve

Constraints: private land; under MRD regional road requirements, General Mineral Resource Area (clay and shale)

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s).

LAKE AMARILLO, SERPENTINE RIVER AND ADJACENT BUSHLAND, KARNUP

Boundary Definition: bushland/bushland group/conservation wetland boundary (Areas of bushland/native vegetation within the boundaries of the Bushplan Site are not accurately mapped.)

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 394 **Map no.** 99, 100, 103, 104 **Map sheet series ref. no.** 2033-II SW
System 6 (1983): Part M108 area of bushland goes beyond System area boundaries, all bushland described

Other Names: not known

Area (ha): total 588.2 (includes open water); bushland 168.8

Local Authorities (Suburb)
 Shire of Rockingham (Karnup)

Zoning
MRS: Rural, Controlled Access Highways
TPS: Rural, Public Purposes, Landscape, No Zone
Lot/Location/Reserve numbers (Purpose),

Ownership Categories
 State Government

Street name
 0, 1a Amarillo Dr
 Crown Reserve

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Pinjarra Plain

Guildford Formation (Qpa: C2) (Qha: Cp)

Bassendean Dunes

Bassendean Sands (Qpb: S8)

Bassendean Dunes/Pinjarra Plain

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

VEGETATION AND FLORA

Vegetation Complex

Pinjarra Plain

Serpentine River Complex

Bassendean Dunes

Bassendean Complex — Central and South

Wetlands

Herdsmen Complex

Marine (lagoonal and estuarine) Deposits

Yoongarillup Complex

Floristic Community Types

Supergroup 2: Seasonal Wetlands

5 Mixed shrub damplands

13 Deeper wetlands on heavy soils

WETLANDS

Wetland Types: floodplain, dampland, palusplain, sumpland, river, artificial channel

Natural Wetland Groups

Bassendean Dunes

Gnangara (B.2)

Swan Coastal Plain Rivers

Goegrup (R.4)

Wetland Management Objectives: Conservation (228.1ha), Resource Enhancement, Multiple Use

Swan Coastal Plain Lakes EPP: 102.6ha + 7.0ha + 1.9ha + 0.2ha = 111.7ha (total)

THREATENED ECOLOGICAL COMMUNITIES

Not assessed

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: open water, vegetated wetland, river, vegetated uplands

Vegetation and Flora: detailed survey (Siemon *et al.* 1993); limited survey (Connell 1995, Gibson *et al.* 1994 (Paga 02-03))

Structural Units: mapping (Siemon *et al.* 1993)

Uplands: *Banksia* species Open Woodland to Closed Woodland

Wetlands: *Eucalyptus rudis* Open Woodland to Open Forest; *Melaleuca* spp. Tall Open Scrub to Closed Tall Scrub; *Melaleuca raphiophylla* Low Closed Forest; *Eucalyptus rudis* and *E. gomphocephala* Woodland; *Eucalyptus rudis* and *Melaleuca raphiophylla* Low Open Forest to Closed Forest; *Melaleuca raphiophylla* and *M. cuticularis* Low Open Forest to Closed Forest; *Melaleuca cuticularis* Low Open Forest to Closed Forest; *Pericalymma ellipticum* and *Hakea varia* Closed Heath; *Juncus kraussii* Closed Sedgeland

Vegetation Condition: Very Good to Good

Total Flora: 38 native taxa, 4 weeds (plot-generated list only, Gibson *et al.* 1994)

Significant Flora: none recorded

Fauna: surveyed by RAOU (1996 D), 26 visits, and Bowman Bishaw Gorham (1992a) for birds (78). Significant bird species: category 1 (1), category 2 (11) and category 3 (9)

Linkage: adjacent bushland to the south, east and west; part of proposed Greenways 81, 139, 140, 83 (Tingay, Alan & Associates 1997a); part of a regionally significant fragmented bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: bushland/naturally vegetated watercourses have particular conservation value in providing habitat for fauna and linkage between larger, more intact areas of bushland; open space of regional significance (DCE 1983); contains 1693m of regionally significant river (WRC 1996a GIS)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed; Location for JAMBA/CAMBA species

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Rarity, Maintaining ecological processes or natural systems, 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 Coastal Plain Lakes EPP, Peel-Harvey Estuary EPP/SPP; location of Scheduled Fauna, conservation category wetlands; under TPS Landscape Zoning, Crown Reserve

Constraints: under MRD regional road requirements, General Mineral Resource Area (clay)

Recommendation: The most appropriate mechanism for the protection of this Bushplan Site be considered through the public comment period in consultation with the land owner(s).



Part B
VOLUME

REFERENCES

3. References

Perth's *Bushplan* uses a variety of information sources such as geographic information systems, databases, aerial photography, Acts, unpublished reports and published reports. For ease of access to all of these original sources each is listed in the References. References authored by a government department are listed under the acronym for that department. References from Volume 2, Part A, section 5 are included in this list.

The References are divided into two sections

- *Geographic Information Systems (GIS), Databases (D) and Photographs (P)*
Database references are annotated with a 'D', geographic information system references are annotated with 'GIS' and aerial photographs with a 'P'.
- *Reports - Published and Unpublished*

Geographic Information Systems (GIS) and Databases (D)

AgWA 1998 GIS *Native Vegetation Mapping of the Perth Metropolitan Area*. Spatial Resource Unit, Agriculture Western Australia, South Perth, Western Australia.

Agriculture Western Australia - refer to AgWA.

AHC 1998 D *Register of the National Estate Database*. Australian Heritage Commission, Canberra, Australian Capital Territory.

Australian Heritage Commission - refer to AHC.

CALM 1998 GIS *Declared Rare and Priority Flora in the Perth Metropolitan Area*. Department of Conservation and Land Management, Como, Western Australia.

DCE 1990 GIS *Vegetation of the Darling System* after Heddlu EM, Loneragan OW and Havel JJ 1980. IN: *DCE 1980 Atlas of Natural Resources, Darling System, Western Australia*. Department of Conservation and Environment, Perth, Western Australia; Ministry for Planning, Perth, Western Australia.

DEP 1992a GIS *Peel Inlet — Harvey Estuary Policy Area* after Government of Western Australia 1992a. *Western Australian Government Gazette*, 11 December, 1992, pp 5969–75.

DEP 1992b GIS *Swan Coastal Plain Lakes Policy Area — legally defined areas with at least 2000m² of surface water as at 1 December 1991* after Government of Western Australia 1992c. *Western Australian Government Gazette*, 18 December, 1992, pp 100–02.

DEP 1995a GIS *Gnangara Mound Crown Land Policy Area* after Government of Western Australia 1992d. *Western Australian Government Gazette*, 24 December, 1992, pp 6287–93.

DEP 1996 D *System 6 and Part System 1 Update Programme*. Unpublished bushland plot and area records. Department of Environmental Protection, Perth, Western Australia.

DEP 1995b GIS *System 6 Recommendation Areas*. Department of Conservation and Environment, Perth, Western Australia.

DEP 1997 GIS *Swan and Canning Rivers Policy Area* after Government of Western Australia 1998. *Western Australian Government Gazette*, 10 July, 1998, pp 3679–96.

DEP 1998 GIS *Western Swamp Tortoise Habitat Draft Policy Area* after EPA 1998. Environmental Protection Authority, Perth, Western Australia.

Department of Conservation and Environment - refer to DCE.

Department of Conservation and Land Management - refer to CALM.

Department of Environmental Protection - refer to DEP.

Department of Land Administration - refer to DOLA.

DOLA 1996 P *Black and White Orthophotographs of the Perth Metropolitan Area*. Department of Land Administration, Midland, Western Australia.

- DOLA** 1997 GIS *Digital Colour Orthophotographs of the Perth Metropolitan Area*. Department of Land Administration, Midland, Western Australia.
- DOLA** 1998a GIS *Cadastre*. Department of Land Administration, Midland, Western Australia.
- DOLA** 1998b GIS *Local Government Authorities*. Department of Land Administration, Midland, Western Australia.
- DOLA** 1998c GIS *Suburbs*. Department of Land Administration, Midland, Western Australia.
- DOLA** 1998d P *PanAirama*. Department of Land Administration, Midland, Western Australia.
- Environment Australia** 1998 D *Wetlands listed under the RAMSAR Convention*. Wetlands Unit, Environment Australia, Department of Environment, Sport and Territories, Canberra, Australian Capital Territory.
- Environmental Protection Authority** - refer to EPA.
- EPA** 1994 GIS *Threatened or Poorly Reserved Plant Communities Requiring Interim Protection*. Environmental Protection Authority, Perth, Western Australia.
- Friend A** 1996 D *CALM Bandicoot Survey 1991-1996*. Database of Bandicoot sitings reported by the public. Department of Conservation and Land Management, Como, Western Australia.
- Geological Survey of WA** 1989 GIS *Perth Metropolitan Region Environmental Geology Series*.
- Gibson N, Keighery BJ, Keighery GJ, Burbidge AH and Lyons MN** 1994 D *Plot records used in 'A Floristic Survey of the Southern Swan Coastal Plain'*. Unpublished Report for the Australian Heritage Commission prepared by the Department of Conservation and Land Management and the Conservation Council of WA, Perth, Western Australia.
- Griffin EA** 1994 D *Plot records used in 'Floristic Survey of Northern Sandplains between Perth and Geraldton'*. Unpublished Report to the Heritage Council of Western Australia for the Australian Heritage Commission, Canberra, Australian Capital Territory.
- Keighery GJ** 1996 D *Plot records from Tuart dominated communities*.
- McArthur WM** 1998 GIS *Change in Species and Structure in the Major Plant Communities of Garden Island, WA 1990-1996*. HMAS STIRLING Environmental Working Paper No. 11. Prepared for the Chairman, Garden Island Advisory Committee, HMAS STIRLING.
- MfP** 1996 GIS *Bushland Mapping of the Perth Metropolitan Area*. Ministry for Planning, Perth, Western Australia.
- MfP** 1997a GIS *Basic Raw Material Resource Areas and Priority*. Department of Minerals and Energy, Perth, Western Australia.
- MfP** 1997b GIS *Extent of Metropolitan Region Scheme*. Ministry for Planning, Perth, Western Australia.
- MfP** 1998a GIS *Metropolitan Region Scheme Zonings*. Western Australian Planning Commission.
- MfP** 1998b GIS *Town Planning Scheme Zonings*. Local Government Authorities.
- MfP and CALM** 1996 GIS *Point locations of Threatened Ecological Communities after English and Blyth 1997*. Department of Conservation and Land Management, Como, Western Australia.
- Ministry for Planning** - refer to MfP.
- National Trust of Australia (WA)** 1998 D *Listing for Landscape and Cultural Environment*. National Trust of Australia (WA), West Perth, Western Australia.
- RAOU** 1996 D *Database of Western Australian Birds Project (RAOU Tracking Database)*.



Royal Australasian Ornithologists' Union - refer to RAOU (now Birds Australia).

Water and Rivers Commission - refer to WRC.

Western Australian Museum of Natural Science 1997 D *Vertebrate Fauna Database*.

Wildflower Society of WA (Inc.), Murdoch Branch 1995 *Flora of Wireless Hill*. Database print out, unpublished.

WRC 1996a GIS *Basin and Channel Wetlands* after Hill et al. 1996b. Water & Rivers Commission, Perth, Western Australia.

WRC 1996b GIS *Consanguineous suites* after Hill et al. 1996b. Water & Rivers Commission, Perth, Western Australia.

WRC 1996c GIS *Conservation Category Wetlands* after Hill et al. 1996b. Water & Rivers Commission, Perth, Western Australia.

WRC 1997 GIS *Verified Conservation Category Wetlands* after Semeniuk, V&C Research Group 1997. Water & Rivers Commission, Perth, Western Australia.

Reports — Published and Unpublished

Abbott I 1977 Observations on the distribution of bird species on small islands near Perth. *Western Australian Naturalist* 13:196-198.

AHC 1990 *Criteria for the Register of the National Estate*. April 1990. Australian Heritage Commission, Canberra, Australian Capital Territory.

AHC 1994 *The Australian Heritage Commission*. Information pamphlet. Australian Heritage Commission, Canberra, Australian Capital Territory.

Ahmat AJ 1993 *The biology of eight non-thermal springs along the Ellen Brook valley*. Honours Thesis. Zoology

Department, The University of Western Australia, Nedlands, Western Australia.

Alan Tingay & Associates - refer to Tingay, Alan & Associates.

Alford J 1996a *Nomination to the Register of the National Estate — Bullsbrook*. Unpublished report to Murdoch University for the Australian Heritage Commission.

Alford J 1996b *Nomination to the Register of the National Estate — Pearce Airforce Base Bushland*. Unpublished report to Murdoch University for the Australian Heritage Commission.

Allen M, Mahoney C, Morald T, Ogden G, Pastega A and Stuart-Street A 1994 *Craigie Open Space Urban Bushland Management Plan*. Unpublished report for assessment as SCI 345 I Environmental Management Project, Edith Cowan University, Joondalup, Western Australia.

Ambrose SJ, Clay PA and Clay BT 1980 *A guide to birds on Harry Waring Marsupial Reserve and Thomsons Lake Nature Reserve*. Unpublished report for the Zoology Department of The University of Western Australia, Nedlands, Western Australia.

ANCA 1994 *A Directory of Important Wetlands in Australia*. ANCA, Canberra, Australian Capital Territory.

ANCA 1996 *A Directory of Important Wetlands in Australia (Second Edition)*. ANCA, Canberra, Australian Capital Territory.

Aplin TEH 1979 *The Flora*. IN: BJ O'Brien (Ed.) *Environment and Science*. University of Western Australia Press, Nedlands, Western Australia.

Appleby M 1997 *Sir Frederick Samson Park Flora List*. Unpublished list prepared for the Parks and Recreation Department, City of Fremantle, Western Australia.

Appropriate Technology Development Group Inc 1988 *Draft Ashfield Flats Design and Management Plan*. Unpublished report for the Town of Bassendean (not adopted, but released for public information), Western Australia.

- Armstrong P** 1993 *Vegetation and Flora Survey of the Shire of Kalamunda Vested Reserves. Volumes 1 and 2.* Unpublished report for the Shire of Kalamunda, Western Australia.
- Arnold GW, Smith GT and Brooker MG** 1991 *Whiteman Park Fauna Survey.* CSIRO Division of Wildlife and Ecology, Perth. Unpublished report for State Planning Commission, Whiteman Park, Western Australia.
- Atkins K** 1998 *Declared Rare and Priority Flora List for Western Australia.* Department of Conservation and Land Management, Como, Western Australia.
- Australian Archaeological Survey Consultants** 1995 *Objection Assessment of the Perth Airport Aboriginal Values.* Unpublished report for the Australian Heritage Commission, Canberra, Australian Capital Territory.
- Australian Heritage Commission** - refer to AHC.
- Australian Nature Conservation Agency** - refer to ANCA.
- Bailey C** 1997 *Parks for People.* IN: *Landscape*, Volume 12, No. 3, Department of Conservation and Land Management. Perth, Western Australia.
- Baird A** 1977 *Regeneration after fire in Kings Park, Perth, Western Australia.* *Journal of the Royal Society of Western Australia* 60: 1-22. Perth, Western Australia.
- Balla SA** 1994 *Wetlands of the Swan Coastal Plain. Volume 1: Their nature and management.* Water Authority of Western Australia and the Western Australian Department of Environmental Protection, Perth, Western Australia.
- Balla SA and Davis JA** 1993 *Managing Perth's wetlands to conserve the aquatic fauna, Volume 5, Wetlands of the Swan Coastal Plain.* Water Authority of Western Australia, Leederville, Western Australia.
- Bamford MJ** 1992 *The impact of fire and increasing time after fire upon Heleioporus eyrei, Limnodynastes dorsalis and Myobatrachus gouldii (Anura: Leptodactylidae) in Banksia Woodland near Perth, Western Australia.* *Wildlife Research* 19: 169-78.
- Bamford MJ and Bamford AR** 1990 *Yellagonga Regional Park: a preliminary survey of vertebrate fauna.* Unpublished.
- Bartle J, Graham G, Lane J and Moore S** 1986 *Forrestdale Lake Nature Reserve — Draft Management Plan.* Department of Conservation and Land Management, Como, Western Australia.
- Bastian L** 1998 *Location of caves in Wanneroo area.* Unpublished map prepared for the City of Wanneroo, Western Australia.
- Beard JS** 1967 *Natural woodland in Kings Park.* *Western Australian Naturalist* 10: 77-84.
- Beard JS** 1979a *Vegetation Survey of Western Australia. The Vegetation of the Perth Area, Western Australia. 1 : 250 000 Series.* Vegmap Publications, Applecross, Western Australia.
- Beard JS** 1979b *Vegetation Survey of Western Australia. The Vegetation of the Pinjarra Area, Western Australia. 1 : 250 000 Series.* Vegmap Publications, Applecross, Western Australia.
- Beard JS** 1990 *Plant Life of Western Australia.* Kangaroo Press, Kenthurst, New South Wales.
- Beeston G, Mlodawski G, True D and Sanders A** 1995 *Remnant vegetation inventory in the southern agricultural areas of Western Australia.* Resource Management Technical Report No. 149. Regional Operations Division, Western Australian Department of Agriculture, South Perth, Western Australia.
- Bell DT, Loneragan WA and Dodd J** 1979 *Preliminary Vegetation Survey of Star Swamp and Vicinity, Western Australia.* *Western Australian Herbarium Research Notes* No. 2: 1-21.

- Benson D and Howell J** 1990 *Taken for Granted: The bushland of Sydney and its suburbs*. Kangaroo Press and Royal Botanic Gardens, Sydney, New South Wales.
- Bennett EM** 1988 *The Bushland Plants of Kings Park*. Kings Park Board, West Perth, Western Australia.
- Bennett EM** 1995 Plant species of the Kings Park bushland. *Western Australian Naturalist* 20: 97-118.
- Binnie & Partners** 1988 *Port Kennedy Regional Recreation Centre Environmental Review and Management Programme. Volumes 1-3*. Report prepared for Port Kennedy Joint Venture.
- Bowman Bishaw Gorham** 1989a *Environmental management aspects pertinent to the development of Lot 2 Paganoni Road Rockingham*. Prepared for the Maddestra Rowe Partnership, South Perth, Western Australia.
- Bowman Bishaw Gorham** 1989b *Serpentine Woodlands Residential/Golf Course Estate supporting data for informal assessment*. Report prepared for Equity Pacific, West-Perth, Western Australia.
- Bowman Bishaw Gorham** 1990 *Proposed Jandakot Botanical Park — an assessment of the conservation values of vegetation, flora and wetlands between Jandakot and Wellard*. Report prepared for the Department of Planning and Urban Development, Perth, Western Australia.
- Bowman Bishaw Gorham** 1992a *Homeswest Provisional Regional Park Boundary at Amarillo*. Discussion Paper prepared for Homeswest.
- Bowman Bishaw Gorham** 1992b *Public Environmental Review — East Joondalup Urban Development Project*. Prepared for Homeswest, Yatala Nominees Pty Ltd and R&I Bank.
- Bowman Bishaw Gorham** 1993 *Urban Development and Conservation Requirements at Ellenbrook (Responses to Conditional Environmental Approval)*. Report No. MI2154, prepared for Ellenbrook Management Pty Ltd.
- Bowman Bishaw Gorham** 1997a *Consultative Environmental Review. Cape Peron Estate, Rockingham*. Report no. MA7010 prepared for Allied Land Company Pty Ltd, West Perth, Western Australia.
- Bowman Bishaw Gorham** 1997b *Vegetation and Flora Survey Cape Peron Estate*. IN: Proposed Residential/Commercial Subdivision Pt Lot Rae 402 Road, Cockburn Sound Location 16, Rockingham (1077) — Consultative Environmental review — response to Issues raised in Public Submissions. Unpublished report prepared for Allied land Company Pty Ltd, West Perth, Western Australia, October 1997.
- Bowman Bishaw Gorham and the Department of Planning and Urban Development** 1994 *Public Environmental Review: Selected south-west corridor land use changes*. Unpublished Report.
- Brock MA and Pen LJ** 1984 *Ecological Studies of the Canning River Wetland*. Prepared for the City of Canning, Western Australia.
- Brooker J** 1995 *Yagan Wetland Reserve Draft Management Plan*. Prepared by the Yagan Wetland Reserve Advisory Group for the City of Canning, Western Australia.
- Brooker J, Brown P, Gaunt T, Fleming J, Lee T, O'Grady D and Siemon N** 1993a *Clontarf Foreshore Management Plan*. Prepared for the City of South Perth, Western Australia.
- Brooker J, Christie C, Curry B, Davis G, Kennedy D, McAlpine K and Masters G** 1993b *Mount Henry Peninsula Management Plan*. Prepared for the City of South Perth, Western Australia.
- Brooker J, Crisp N and Prentice G** 1994a *Salter Point Foreshore Reserve Management Plan*. Prepared for the City of South Perth, Western Australia.

- Brooker J, Carr A and Knox I** 1994b *Waterford Foreshore Reserve Management Plan*. Prepared for the City of South Perth, Western Australia.
- Brooker MG, Smith GT, Saunders DA, Ingram JA, Leone J and de Rebeira CPS** 1995a A biological survey of Garden Island, Western Australia. IN: *Birds and Reptiles. Western Australian Naturalist* 20: 169-184.
- Brooker MG, Smith GT, Leone J and Ingram JA** 1995b A biological survey of Garden Island, Western Australia. IN: *Terrestrial Mammals. Western Australian Naturalist* 20: 211-20.
- Burbidge AA and Kuchling G** 1994 *Western Swamp Tortoise Recovery Plan. Wildlife Management Program No. 11*. Department of Conservation and Land Management, Como, Western Australia.
- Burbidge AH, Rolfe J and Keighery GJ** (in prep.) *Biological Survey of Yanchep National Park*. Department of Conservation and Land Management, Como, Western Australia.
- CALM** 1987 *Forrestdale Lake Nature Reserve Management Plan 1987-1992. Management Plan No. 3*. Prepared for the National Parks and Nature Conservation Agency, Western Australia.
- CALM** 1989 *Yanchep National Park Management Plan 1989 - 1999. Management Plan No. 14*. Co-ordinator V. Smith. Prepared for the National Parks and Nature Conservation Authority, Western Australia.
- CALM** 1992a *Shoalwater Islands Management Plan 1992-2002. Management Plan No. 21*. Co-ordinator K. Orr. Prepared for the National Parks and Nature Conservation Authority, Western Australia.
- CALM** 1992b *Matilda Bay Reserve Management Plan 1992-2002. Management Plan No. 95*. Prepared for the National Parks and Nature Conservation Authority, Western Australia.
- CALM** 1993 *Fauna Studies in water supply reserve 34537, Adjacent to Neerabup National Park*. Unpublished report prepared for Water Authority of Western Australia, Leederville, Western Australia.
- CALM** 1994 *Forest Management Plan 1994 - 2003*. Prepared for the Lands and Forest Commission, Western Australia.
- CALM** 1997 *Annual Report 1996-97*. Department of Conservation and Land Management, Como, Western Australia.
- CALM** 1998 *Declared Rare and Priority Fauna List for Western Australia*. Unpublished report to the Department of Conservation and Land Management, Como, Western Australia.
- CALM, NPNCA and City of Canning** 1997 *Canning River Regional Park Management Plan 1997-2007. Management Plan No. 36*. Western Australia.
- Chambers F** 1997a *Nomination to the Register of the National Estate — Bullsbrook Nature Reserve C1654 (M14) and Bullsbrook Reserve 27583*. Unpublished report to Murdoch University for the Australian Heritage Commission.
- Chambers F** 1997b *Nomination to the Register of the National Estate — upgrade of Nomination for Bullsbrook Bushland*. Unpublished report to Murdoch University for the Australian Heritage Commission.
- Chambers J and Pen L** 1985 *Resource Maps Swan-Canning Estuarine System for the Fact Finding Study Metropolitan Region Scheme Parks and Reserves*. Swan River Management Authority.
- Chape S** 1984 *Penguin Island Draft Management Plan*. National Parks Authority, Western Australia.
- Christides L and Bowles WE** 1994. *The taxonomy and species of birds of Australia and its territories*. RAOU Monograph 2.
- Churchward HM and McArthur WM** 1980 *Landforms and Soils of the Darling System*. IN: *Atlas of Natural Resources, Darling System, Western Australia*. Department of Conservation and Environment, Western Australia.

- City of Cockburn** 1990 *Henderson Management Plan*. City of Cockburn, Western Australia.
- City of Fremantle** 1989 *Sir Frederick Samson Park Draft Management Plan*. Parks and Recreation Department, City of Fremantle, Western Australia.
- City of Fremantle** 1995 *Sir Frederick Samson Park Draft Management Plan*. Parks and Recreation Department, City of Fremantle, Western Australia.
- City of Melville** 1992 *Blue Gum Reserve Management Plan*. Parks and Services Department, City of Melville, Western Australia.
- City of Wanneroo** 1995a *Warwick Open Space Management Plan*. Prepared for the City of Wanneroo Parks Department, Western Australia.
- City of Wanneroo** 1995b *Koondoola Regional Open Space. Draft Management Plan*. Prepared for the City of Wanneroo Parks Department, Western Australia.
- Clay BT** 1980 *Harry Waring Marsupial Reserve Flora - May 1980*. Department of Zoology, University of Western Australia, Nedlands, Western Australia.
- Coalition for Wanneroo's Environment** 1993 *Koondoola Open Space Assessment. Natural Environment Assessment Form — Landscape and Conservation*. Unpublished report for the National Trust of Australia (WA).
- Cockburn Wetlands Committee** 1976 *The Cockburn Wetlands — An Environmental Study*. Report by students of Murdoch University, coordinated by P. Newman.
- Commissioner of Soil and Land Conservation** 1997 Memorandum of Understanding between the Commissioner of Soil and Land Conservation, Environmental Protection Authority, Department of Environmental Protection, Agriculture Western Australia, Department of Conservation and Land Management, Water and Rivers Commission for the Protection of Remnant Vegetation on Private Land in the Agricultural Region of Western Australia.
- Department of Agriculture, Subiaco, Western Australia.
- Commonwealth of Australia** 1996 *The National Strategy for Conservation of Australia's Biological Diversity*. AGPS, Canberra, Australian Capital Territory.
- Connell S** 1995 *Perth Environment Project — Remnant Vegetation Inventory and Assessment*. Unpublished report to the Australian Heritage Commission (National Estate Grants Programme) and the Ministry for Planning, Perth, Western Australia.
- Conservation Council of WA** 1994 *Proposal for Yule Brook Nature Reserve*.
- Cooper NK, Dell J and Cowan ME** (in press) *The vertebrate fauna of Bennett Brook and Success Hill Reserve, Caversham. Western Australian Naturalist*.
- Costa P** 1977 *Biogeography and ecology of lizards on local and offshore islands*. Honours thesis, The University of Western Australia, Nedlands, Western Australia.
- Cranfield RJ and Parker CM** 1992 *Flowering Calendar for Reserve No. 3694 in Metropolitan Perth. Western Australian Naturalist* 19: 48-59.
- Cresswell I and Bridgewater P** 1985 *Dune vegetation of the Swan Coastal Plain, Western Australia. Journal of the Royal Society of Western Australia* 67: 137-148.
- Crook IG** 1980 *Nature reserves in the Shire of Serpentine-Jarrahdale. Western Australian Nature Reserve Management Plan No. 3*. Department of Fisheries and Wildlife, Perth, Western Australia.
- Crook IG and Evans T** 1981 *Thomson's Lake Nature Reserve. Western Australian Nature Reserve Management Plan No. 2*. Department of Fisheries and Wildlife, Perth, Western Australia.
- Crypto Environmental Surveyors** 1995 *Frog and Reptile list for the Koondoola Regional Open Space IN: Wake D. 1995 Natural Environment Nomination for the Register of the National Estate*.

- Koondoola Open Space. Unpublished report for the National Trust of Australia (WA).
- Dames and Moore** 1986a *Flora and Fauna Survey, Alfred Road to West Coast Highway Road Link*. Unpublished report for the Main Roads Department.
- Dames and Moore** 1988a *Carine Lake Regional Open Space Reserve Draft Management Plan*. Prepared for the City of Stirling, Western Australia.
- Dames and Moore** 1988b *Public Environmental Report Proposed Harvey — Kwinana 330kV Transmission Line*. Unpublished report (Job No. 08038-092-071) for the State Energy Commission of Western Australia, Perth, Western Australia.
- Dames and Moore** 1990 *Local Climate, Vegetation and Flora, Fauna and Landscaping of the Ellenbrook Project Area — Appendix A1*. Unpublished report (Job No. 16178-016-071) for Feilman Planning Consultants (1992).
- Dames and Moore** 1992a *Jandakot Environmental Review and Management Plan*. Unpublished report to Department of Environmental Protection, Perth, Western Australia.
- Dames and Moore** 1992b *Proposed Realignment of the West Coast Highway, City Beach. Public Environmental Review*. Prepared for the City of Perth, Western Australia.
- Dames and Moore** 1992c *Conservation Assessment: Ellenbrook Development. Appendix A2*. Unpublished report (Job No. 21170-001-071) for Feilman Planning Consultants.
- Dames and Moore** 1993 *Draft Environmental Impact Statement Proposed Additional Developments at Jandakot Airport*. Unpublished report (Job No. 18534-011-363) for the Federal Airports Corporation, Belmont, Western Australia.
- Davidge C** 1979 A census of a community of small terrestrial vertebrates. *Australian Journal of Ecology* 4: 165-70.
- Davis JA, Rosich RS, Bradley JS, Growns JE, Schmidt LG and Cheal F** 1993 *Wetland classification on the basis of water quality and invertebrate community data, Volume 6, Wetlands of the Swan Coastal Plain*. Water Authority of Western Australia, Leederville, Western Australia.
- DCE** 1976 *Conservation Reserves for Western Australia. System 1, 2, 3, 5*. Department of Conservation and Environment, Perth, Western Australia.
- DCE** 1983 *Conservation Reserves for Western Australia. The Darling System — System 6. Parts 1 and 2. Report 13*. Department of Conservation and Environment, Perth, Western Australia.
- Dell J** 1983 The importance of the Darling Scarp to fauna. IN: Majer JD (Ed.) *Scarp Symposium* (pp 17-28). Western Australian Institute of Technology, Bentley, Western Australia.
- Dell J** 1995 Fauna. IN: Keighery BJ (Ed.) *Knowing and Managing the Brixton Street Wetlands*. Unpublished report for the Friends of Brixton Street and the Perth Branch of the Wildflower Society of WA (Inc.), Nedlands, Western Australia.
- Dell J and Cooper NK** 1995 *The vertebrate fauna of Ken Hurst Park, Melville*. Unpublished report for the Melville City Council.
- Dell J and How RA** 1988 Mammals of the Darling Scarp. *Western Australian Naturalist* 17: 86-93.
- Dell J, How RA and Burbidge AH** 1998 *Vertebrate Fauna of Tuart Woodlands*. Paper presented at a workshop on 'Tuart (*Eucalyptus gomphocephala*) - the tree and the community with which it lives' Proceedings will be published by the Wildflower Society of WA (Inc.), Perth Branch, in 1999.
- DEP** 1996 *System 6 and Part System 1 Update Programme*. Unpublished bushland plot and area records and analysis. Department of Environmental Protection, Perth, Western Australia.

DEP 1998 *System 6 and Part System Update Programme*. Unpublished bushland area records. Department of Environmental Protection, Perth, Western Australia.

Department of Conservation and Environment - refer to DCE.

Department of Conservation and Land Management - refer to CALM.

Department of Environmental Protection - refer to DEP.

Department of Planning and Urban Development - refer to DPUD.

Dixon J, Connell S, Bailey J and Keenan C 1994 The Perth Environmental Project and an inventory of Perth's remnant native vegetation. IN: *A Vision for a Greener City*, the Proceedings of the 1994 National Greening Australia Conference, Perth, Western Australia.

DPUD 1991 *Yellagonga Regional Park — Supplementary Report*, Perth, Western Australia.

DPUD 1992a *Beeliar Regional Park Proposals for Establishment, Administration and Use*. Department of Planning and Urban Development, Perth, Western Australia.

DPUD 1992b *Yellagonga Regional Park*. Department of Planning and Urban Development, Perth, Western Australia.

DPUD 1993 *Darling Range Regional Park*. Department of Planning and Urban Development, Perth, Western Australia.

Ecologia 1991 *Bushmead Rifle Range Biological Survey - Summary Report*. Appendix A. IN: Halpern Glick Maunsell, *Draft Environmental Impact Statement for Proposed Sale of Commonwealth Land at the Bushmead Rifle Range Site*, Western Australia. Perth, Western Australia.

Ecologia 1997 *Mitchell Freeway: Romeo Road to Perth—Lancelin Road: Biological Assessment*. Unpublished report to Main Roads, Western Australia.

Ecoscape 1989 *Cantonment Hill Management Report*. Prepared for the City of Fremantle, Western Australia.

Ecoscape 1991 *Point Resolution Management Plan*. Prepared for the City of Nedlands, Western Australia.

Ecoscape 1994a *Shenton Bushland Draft Management Plan*. Prepared for the City of Nedlands, Western Australia.

Ecoscape 1994b *Yangebup Lake Draft Management Plan*. Prepared for the City of Cockburn, Western Australia.

Ecoscape 1995a *Jane Brook Draft Environmental Management Plan*. Prepared for the Shire of Swan, Western Australia.

Ecoscape 1995b *Draft Market Garden Swamps Environmental Management Plan*. Prepared for the City of Cockburn, Western Australia.

Ecoscape 1996 *Shenton Bushland Management Plan*. Prepared for the City of Nedlands, Western Australia.

Ecoscape and Landmarc 1992 *Piney Lakes Reserve Concept Plan*. Prepared for the City of Melville, Western Australia.

EM Mattiske & Associates - refer to Mattiske, EM & Associates.

English VJ and Blyth J 1997 *Identifying and Conserving Threatened Ecological Communities in the South West Botanical Province*. Project Number N702, Final Report to Environment Australia. Department of Conservation and Land Management, Perth, Western Australia.

Environmental Protection Authority - refer to EPA.

Environmental Science Murdoch University 1986 *North Lake Draft Management Plan*. Murdoch University, Murdoch, Western Australia.

EPA 1985a *Peel Inlet and Harvey Estuary Management Strategy, Report and Recommendations by the Environmental Protection Authority — Assessment*



- Report of Stage 1 ERMP (Bulletin 243). Department of Conservation and Environment, Perth, Western Australia.
- EPA 1985b** *Proposed Cyclepath on the Swan River (Milne Street, Bayswater to Mitchell Street, Mt Lawley)* (Bulletin 240). Department of Conservation and Environment, Perth, Western Australia.
- EPA 1987** *Alfred Cove — A Wildlife Habitat* (Bulletin 298). Environmental Protection Authority, Perth, Western Australia.
- EPA 1988** *Peel Inlet and Harvey Estuary Management Strategy, Environmental Review and Management Programme Stage 2 — Report and Recommendations of the Environmental Protection Authority, Parts I and II* (Bulletin 363). Environmental Protection Authority, Perth, Western Australia.
- EPA 1990** *A Guide to wetland management in Perth* (Bulletin 374). Environmental Protection Authority, Perth, Western Australia.
- EPA 1991** *Subdivision: Concept plan and design Lots 37 and 47 Brixton Street, Kenwick* (Bulletin 577). Environmental Protection Authority, Perth, Western Australia.
- EPA 1992a** *Proposed sale of Commonwealth land at the Bushmead Rifle range site for housing development. Commonwealth Department of Administration Services. Advice of the Environmental Protection Authority to the Commonwealth Environmental Protection Agency* (Bulletin 632).
- EPA 1992b** *Proposed urban development of Lots 35 and 48 Brixton Street, Kenwick, City of Gosnells* (Bulletin 635). Environmental Protection Authority, Perth, Western Australia.
- EPA 1994** *Rezoning of land from Urban Deferred to Urban — Egerton (adjacent to Ellenbrook)* (Bulletin 743). Environmental Protection Authority, Perth, Western Australia.
- EPA 1997a** *Draft Environmental Protection (State Groundwater) Policy 1997*.
- Environmental Protection Authority, Perth, Western Australia.
- EPA 1997b** *Alfred Cove — A Wildlife Habitat* (Bulletin 298), prepared by S. Keeling, Manvers Pty Ltd for the Environmental Protection Authority, Perth, Western Australia.
- EPA 1998** *Second Draft Environmental Protection (Western Swamp Tortoise Habitat) Policy 1998*. Environmental Protection Authority, Perth, Western Australia.
- EPA and WAWA 1990** *Jenny Arnold's Perth Wetlands Resource Book: Chapters 1-15* (Bulletin 266). Environmental Protection Authority, Perth, Western Australia.
- Evangelisti & Associates, Landvision and V&C Semeniuk Research Group 1995** *Water Resources Management Plan: Middle Canning Catchment (Stage 1, Volume 1)*. Unpublished report prepared for the Water Authority of Western Australia, Leederville, Western Australia.
- EMRC Environmental Services and Shire of Kalamunda 1997** *Maida Vale Reserve Draft Management Plan*. Report for the Shire of Kalamunda, Western Australia.
- Feilman Planning Consultants 1992** *Ellenbrook Public Environmental Review Report*. Prepared for Ellenbrook Management Pty Ltd.
- Foulds W 1987** *Ecology of Pinnaroo Valley Memorial Park, Western Australia: floristics and nutrient status. Kingia 1(1): 27-28*.
- Fox JED, Downes S and Maslin BR 1980** *The vascular plants of Yalgorup National Park. WA Herbarium Research Notes 3: 1-18*.
- Fox JED and Majer JD 1981** *Vegetation Study of Woodman Point Quarantine Station Area*. Unpublished report prepared for the Western Australian Institute of Technology.
- Gibson N and Keighery BJ (Eds) 1992** *Bushland in Our Backyard*. Proceedings of a workshop held by the Wildflower Society of Western Australia (Inc.), June, 1992.

- Gibson N, Keighery BJ, Keighery GJ, Burbidge AH and Lyons MN** 1994 *A Floristic Survey of the Southern Swan Coastal Plain*. Unpublished Report for the Australian Heritage Commission prepared by the Department of Conservation and Land Management and the Conservation Council of Western Australia (Inc.).
- Glossop B** 1979 *Flora and vegetation surveys of the Spectacles*. Unpublished Alcoa Notes.
- Goble-Garratt EM** 1991 Report on the Biological Survey of Lots 48 and Pt 35 Brixton Street Kenwick. IN: Hames Sharley Australia 1991b *Consultative Environmental Review: Glenhaven Estate Lot 48 and part Lot 35 Brixton Street Kenwick*. Report prepared for St Joseph's Properties and Dudley Dwyer Ltd.
- Goble-Garratt EM** 1993 *Report on a survey of the flora and vegetation of Lots 122, 123 and 403 Acourt Road, Canning Vale*. Unpublished report for Wood and Grieve Engineers.
- Government of New South Wales** 1986 *State Environmental Planning Policy No. 19 — Bushland in Urban Areas*.
- Government of Western Australia** 1992a *Environmental Protection (Peel Inlet — Harvey Estuary) Policy 1992*. Western Australian Government Gazette, 11 December, 1992, pp 5969–75.
- Government of Western Australia** 1992b *Statement of Planning Policy No. 2 — The Peel-Harvey Coastal Pain Catchment*. Western Australian Government Gazette, 21 February, 1992, pp 945–55.
- Government of Western Australia** 1992c *Environmental Protection (Swan Coastal Plain Lakes) Policy 1992*. Western Australian Government Gazette, 18 December, 1992, pp 100–02.
- Government of Western Australia** 1992d *Environmental Protection (Gnangara Mound Crown Land) Policy 1992*. Western Australian Government Gazette, 24 December, 1992, pp 6287–93.
- Government of Western Australia** 1995a *Urban Bushland Strategy*. Ministry for Planning, Perth, Western Australia.
- Government of Western Australia** 1995b *Statement of Planning Policy No. 3 — Gnangara Mound Crown Land*. Western Australian Government Gazette, 8 September, 1995, pp 4245–49.
- Government of Western Australia** 1997 *Wetlands Conservation Policy for Western Australia*.
- Government of Western Australia** 1998a *Statement of Planning Policy No. 6 — Jandakot Groundwater Protection Policy*. Western Australian Government Gazette, 12 June, 1998, pp 3209–32.
- Government of Western Australia** 1998b *Environmental Protection (Swan and Canning Rivers) Policy 1998*. Western Australian Government Gazette, 10 July, 1998, pp 3679–96.
- Gozzard JR** 1982a *Yanchep Sheet 2034 IV, Environmental Geology Series*. Geological Survey of Western Australia, Department of Minerals and Energy, Perth, Western Australia.
- Gozzard JR** 1982b *Muchea Sheet 2034 I and part Sheet 2134 IV, Environmental Geology Series*. Geological Survey of Western Australia, Department of Minerals and Energy, Perth, Western Australia.
- Gozzard JR** 1983a *Fremantle Part Sheet 2033 I and 2033 IV, Environmental Geology Series*. Geological Survey of Western Australia, Department of Minerals and Energy, Perth, Western Australia.
- Gozzard JR** 1983b *Rockingham Sheet 2033 II and 2033 III, Environmental Geology Series*. Geological Survey of Western Australia, Department of Minerals and Energy, Perth, Western Australia.
- Gozzard JR** 1986 *Perth Sheet 2034 II and part Sheets 2034 II and 2134 III, Environmental Geology Series*. Geological Survey of Western Australia, Department of Minerals and Energy, Perth, Western Australia.

- Gray M** 1993 *Evaluation of the National Estate value of remnant bushland on the Swan Coastal Plain between Moore River and Mandurah. Brixton Street Wetlands and adjacent bushland including System 6 areas M69.* Unpublished report to the Wildflower Society of WA (Inc.) for the Australian Heritage Commission.
- Gray M** 1994a *Evaluation of the National Estate value of remnant bushland on the Swan Coastal Plain between Moore River and Mandurah. Bullsbrook Bushland including System 6 areas M14 and M15.* Unpublished report to the Wildflower Society of WA (Inc.) for the Australian Heritage Commission.
- Gray M** 1994b *Evaluation of the National Estate values of remnant bushland on the Swan Coastal Plain between Moore River and Mandurah. Garden Island. System 6 area M96.* Unpublished report to the Wildflower Society (Inc.) of WA for the Australian Heritage Commission.
- Green JW** 1985 *Census of Vascular Plants of Western Australia.* Department of Agriculture, Perth, Western Australia.
- Greening Western Australia, Point Walter Group** 1994 *Draft Management Plan for Point Walter Bushland.*
- Griffin EA** 1993 *Flora of the Quindalup Dunes between the Swan and Irwin Rivers, Western Australia.* Unpublished report to the Coastal Planning Branch, the Department of Planning and Urban Development and the Heritage Council of WA, East Perth, Western Australia.
- Griffin EA** 1994 *Floristic Survey of Northern Sandplains between Perth and Geraldton.* Unpublished report to the Heritage Council of WA for the Australian Heritage Commission, Canberra, Australian Capital Territory.
- Griffin EA and Trudgen ME** 1994 *Variation on the floristic composition of the vegetation growing on the Holocene dunes between Whitfords and Lancelin, and recommendations for reservation to conserve the variation present.* Unpublished report for Bowman Bishaw Gorham, West Perth, Western Australia.
- Halpern Glick Maunsell** 1992 *Lake Gwelup Reserve Environmental Management Plan.* Prepared for the City of Stirling, Western Australia.
- Halpern Glick Maunsell Pty Ltd and Tingay, Alan & Associates** 1991 *An Environmental Assessment of Structure Plans for Leda.* Unpublished report for Landcorp, Perth, Western Australia.
- Hames Sharley Australia** 1991a *Proposed Urban Development and Wetland Conservation on Lot 37 and 47 Brixton Street, Kenwick, City of Gosnells: Consultative Environmental Review.* Report prepared for Homeswest.
- Hames Sharley Australia** 1991b *Consultative Environmental Review: Glenhaven Estate Lot 48 and part Lot 35 Brixton Street Kenwick.* Report prepared for St Joseph's Properties and Dudley Dwyer Ltd.
- Hames Sharley Australia** 1992 *Coastal Planning Study, Burns Beach to Jindalee.* Summary and Technical Report prepared for the Department of Planning and Urban Development and the City of Wanneroo, Western Australia.
- Hames Sharley Australia** 1993 *Queens Park Regional Recreation Area Master Plan.* Unpublished report for the City of Canning, Western Australia.
- Hart Simpson & Associates Pty Ltd** 1989 *Kwinana Freeway, Yangebup Road to Thomas Road, Biological Survey.* Unpublished report for the Main Roads Department.
- Hart Simpson & Associates Pty Ltd** 1990 *Hopelands Mineral Sands Project. Wetland Vegetation.* Unpublished report for Pittison Mineral Sands Joint Venture.
- Harvey MS, Dell J, How RA and Waldock JM** 1997 *Ground Fauna of Bushland Remnants on the Ridge Hill Shelf and Pinjarra Plain Landforms, Perth.* Unpublished Report to the Australian Heritage Commission, Canberra, Australian Capital Territory.
- Havel JJ** 1968 *The potential of the northern Swan Coastal Plain for Pinus pinaster Ait. Plantations.* Bulletin 76, Forests Department of Western Australia.



- Hedde EM** 1980 *Effects of Changes in Soil Moisture on the Native Vegetation of the Northern Swan Coastal Plain, Western Australia*. Bulletin 92, Forests Department of Western Australia.
- Hedde EM, Loneragan OW and Havel JJ** 1980 Vegetation of the Darling System. IN: DCE 1980 *Atlas of Natural Resources, Darling System, Western Australia*. Department of Conservation and Environment, Perth, Western Australia.
- Hill AL and Del Marco A** 1996 Wetland evaluation. IN: Hill et al. 1996a *Wetlands of the Swan Coastal Plain. Volume 1: Wetland Mapping, Classification and Evaluation — Main Report*. Prepared for the Water and Rivers Commission and the Department of Environmental Protection, Perth, Western Australia.
- Hill AL, Semeniuk CA, Semeniuk V and Del Marco A** 1996a *Wetlands of the Swan Coastal Plain. Volume 1: Wetland Mapping, Classification and Evaluation — Main Report*. Prepared for the Water and Rivers Commission and the Department of Environmental Protection, Perth, Western Australia.
- Hill AL, Semeniuk CA, Semeniuk V and Del Marco A** 1996b *Wetlands of the Swan Coastal Plain. Volume 2: Wetland Mapping, Classification and Evaluation — Wetland Atlas*. Prepared for the Water and Rivers Commission and the Department of Environmental Protection, Perth, Western Australia.
- Hosken DJ and O'Shea JE** 1994 *Falsistrellus mackenziei* at Jandakot. *Western Australian Naturalist* 19: 351.
- How RA** (Ed.) 1978 *Faunal studies of the Northern Swan Coastal Plain: A consideration of Past and Future Changes* Western Australian Museum. Unpublished report for the Department of Conservation and Environment, Perth, Western Australia.
- How RA** 1995 *Objection Assessment of the Faunal Values for the Perth Airport*. Unpublished report to the Australian Heritage Commission.
- How RA and Dell J** 1990 Vertebrate fauna of Bold Park, Perth. *Western Australian Naturalist* 18: 122–31.
- How RA and Dell J** 1993 Vertebrate fauna of the Perth metropolitan region: consequences of a modified environment. IN: Hipkins M (Ed.) *Urban Bush Management*, pp 28–47. Australian Institute of Urban Studies, Perth, Western Australia.
- How RA and Dell J** 1994 The zoogeographic significance of urban bushland remnants to reptiles in the Perth region, Western Australia. *Pacific Conservation Biologist* 1:132–140.
- How RA, Harvey MS, Dell J and Waldock J** 1996 *Ground Fauna of Urban Bushland Remnants in Perth*. Report to the Australian Heritage Commission, Canberra, Australian Capital Territory.
- Jackson M, Morris K, Harold G and Kitchener D** 1975 *A Spring 1975 Biological Survey of the Proposed Mussel Pool Complex and Recommendations for its Future Development*. Report prepared for the Western Australian Museum of Natural Science, Perth, Western Australia.
- Jaesch R** 1987 Waterbirds in the Swan—Canning Estuary. Proceedings of a Symposium on the Swan Canning Estuary, Curtin University. IN: Meney K 1987 *Draft Management Plan, Maylands Foreshore Reserve (East Street to Fogerthorpe Crescent)* City of Stirling, Western Australia.
- Jaesch R, Merrifield J and Raines J** 1993 *Waterbirds of South-western Australia: Highest numbers counted, 1981–1991*. Western Australian Bird Notes (Supplement 1), Number 68
- Jasinska EJJ** 1997 *Aquatic root fauna in caves of southwestern Australia: origins and ecology*. PhD Thesis submitted to the Zoology Department, University of Western Australia, Nedlands, Western Australia.
- Jasinska E and Knott B** 1991 *Stability of Root Mat Ecosystems in a Groundwater Stream: Cabaret Cave, Yanchep National Park, Western Australia*. Unpublished report (Endangered Species Project 46) for the Australian National Parks and Wildlife Service.

Jasinska E and Knott B 1994 *Aquatic fauna in the Gnangara Mound discharge areas of the Ellen Brook catchment, Western Australia*. Unpublished report for the Department of Zoology, University of Western Australia, for the Water Authority of Western Australia, Leederville, Western Australia.

Jasinska E and Knott B 1995 *Water Requirements of Cave Dwelling in the Yanchep Area*. Section 46, Appendix 3, pp 113-19. IN: *Review of Proposed Changes to Environmental Water Conditions, Gnangara Mound Groundwater Resources*. Water Authority of Western Australia, Leederville, Western Australia.

Job R 1972 *Birds seen at Pelican Point, 1966-1968*. *Western Australian Naturalist* 12: 56-59.

Jordan JE 1986a *Armadale Sheet part of Sheets 2033 I and 2133 IV. Environmental Geology Series*. Geological Survey of Western Australia, Department of Minerals and Energy, Perth, Western Australia.

Jordan JE 1986b *Serpentine Sheet part of Sheets 2033 II and 2133 III. Environmental Geology Series*. Geological Survey of Western Australia, Department of Minerals and Energy, Perth, Western Australia.

Kabay ED 1979 *Fauna Survey of 'G' Area (The Spectacles)*. Unpublished Alcoa Notes.

Kaesehagen D 1994 *Bushland Condition Mapping*. IN: Burke G (Ed.) *Invasive Weeds and Regenerating Ecosystems in Western Australia*. Proceedings of the conference held at Murdoch University.

Keating CDM and Trudgen ME 1986 *A flora and vegetation survey of the Point Peron — Lake Richmond area*. Prepared for the State Planning Commission of Western Australia, Perth, Western Australia.

Keighery BJ 1994a *Bushland Plant Survey. A Guide to Plant Community Survey for the Community*. Wildflower Society of WA (Inc.), Nedlands, Western Australia.

Keighery BJ 1994b *Vegetation and Flora Report for System Six Proposed Reserve — M53*. Unpublished report for the

Department of Environmental Protection, Perth, Western Australia.

Keighery BJ 1994c *Vegetation and Flora Report of Location 101 (M15)*. Unpublished report for the Wildflower Society of WA (Inc.), Nedlands, Western Australia.

Keighery BJ 1994d *Objection Assessment of the values of the flora of the Hepburn Heights — Pinnaroo Park Area*. Unpublished report for the Australian Heritage Commission.

Keighery BJ 1995a *Natural Areas at the Pearce Airforce Base, Western Australia*. Unpublished report for the Department of Environmental Protection, Perth, Western Australia.

Keighery BJ 1995b *Vegetation and Flora of Lot 139 Brentwood Road, Kenwick (part Threatened and Poorly Reserved Community area Brixton 1)*. Unpublished report for the Department of Environmental Protection, Perth, Western Australia.

Keighery BJ 1995c *Vegetation and Flora Report for ACTIV— an area recognised as in need of interim protection under the System Six Update programme*. Unpublished report for the Department of Environmental Protection, Perth, Western Australia.

Keighery BJ 1995d *Vegetation and Flora Report for Lot 106 Wanaping Road, Kenwick, part interim protected area under the System Six Update Programme*. Unpublished report for the Department of Environmental Protection, Perth, Western Australia.

Keighery BJ 1995e *Department of Environmental Protection System 6 Update programme: Flora List and Vegetation Notes for M52, Perth Airport*. Unpublished report for the Department of Environmental Protection, Perth, Western Australia.

Keighery BJ 1995f *Description of the Vegetation of part Pearce 4 — Area to the North and South of Kimberley Street*. Unpublished report for the Department of Environmental Protection, Perth, Western Australia.

Keighery BJ 1996a *Objection Assessment of the values of the vegetation and flora of the Beeliar Wetlands*. Unpublished report for the Australian Heritage Commission.

Keighery BJ 1996b *A description of remnant vegetation of Bennett Brook (System Six Area M41)*. Report prepared for the Department of Environmental Protection, Perth, Western Australia.

Keighery BJ 1996c *Flora Information for Roadside Bush Protection Plans for the Shire of Serpentine-Jarrahdale*. Unpublished report for the Shire of Serpentine-Jarrahdale Roadside Care Volunteers.

Keighery BJ, Gibson N and Keighery GJ 1997 The regional Significance of the Flora and Vegetation of Garden Island. IN: *The proceedings of the Environment and Energy Conference*, Royal Australian Navy Directory of Environmental Management, April 1997.

Keighery BJ and Gray M 1993 Towards an Urban Bushland Policy for the National Trust (WA). A Discussion Paper. IN: National Trust of Australia (WA), *Urban Bushland Policy*. National Trust of Australia (WA), Wildflower Society of Western Australia (Inc.) and The Tree Society (Inc.), Perth, Western Australia.

Keighery BJ and Keighery GJ 1995 Flora. IN: Keighery BJ (Ed.) 1995 *Knowing and Managing the Brixton Street Wetlands*. Unpublished report for the Friends of Brixton Street and the Perth Branch of the Wildflower Society of WA (Inc.), Nedlands, Western Australia.

Keighery BJ, Keighery GJ and Gibson N 1995 *Floristics of Lowlands. Floristics of Reserves and Bushland Areas of the System Six Region, Part X*. Wildflower Society of Western Australia (Inc.), Nedlands, Western Australia.

Keighery BJ, Keighery GJ and Gibson N 1997a Part XI: Floristics of the Mundijong Bushland. IN: Keighery BJ, Keighery GJ and Gibson N 1997 *Floristics of Reserves and Bushland Areas of the Perth Region (System 6). Parts XI-XV*. Wildflower

Society of Western Australia (Inc.), Nedlands, Western Australia.

Keighery BJ, Keighery GJ and Gibson N 1997b Part XIII: Floristics of the Neerabup National Park. IN: Keighery BJ, Keighery GJ and Gibson N 1997 *Floristics of Reserves and Bushland Areas of the Perth Region (System 6). Parts XI-XV*. Wildflower Society of Western Australia (Inc.), Nedlands, Western Australia.

Keighery BJ, Keighery GJ and Gibson N 1997c Part XIV: Floristics of the Lakes Cooloongup and Walyungup Bushland. IN: Keighery BJ, Keighery GJ and Gibson N 1997 *Floristics of Reserves and Bushland Areas of the Perth Region (System 6). Parts XI-XV*. Wildflower Society of Western Australia (Inc.), Nedlands, Western Australia.

Keighery BJ and Trudgen ME 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 Program.

Keighery GJ 1990a *Coastal Limestone Endemics*. Unpublished report for the Department of Conservation and Land Management, Perth, Western Australia.

Keighery GJ 1990b *Floristics of Alfred Cove, Pelican Point and Milyu Nature Reserve. Part I of Floristics of Reserves and Bushland Areas of the Perth Region (System 6)*. Unpublished report for the Department of Conservation and Land Management, Perth, Western Australia.

Keighery GJ 1991a Part III: Flora List for Blackwall Reach Reserve. IN: Keighery GJ and Keighery BJ 1991 *Floristics of Reserves and Bushland Areas of the Perth Region (System 6). Parts II-IV*. Wildflower Society of Western Australia (Inc.), Nedlands, Western Australia.

Keighery GJ 1991b Part IV: Vegetation and Flora of Hepburn Heights. IN: Keighery GJ and Keighery BJ 1991 *Floristics of Reserves and Bushland Areas of the Perth Region (System 6). Parts II-IV*. Wildflower Society of Western Australia (Inc.), Nedlands, Western Australia.

- Keighery GJ** 1991c *Flora and Vegetation of the Mindarie Cusp Area*. Unpublished report to the Department of Conservation and Land Management for the Department of Planning and Urban Development, Perth, Western Australia.
- Keighery GJ** 1992a *Jandakot Botanical Park Report 1: Overview of Botanical Communities and their Significance: Anstey Road Wetlands (Lots 65166 and reserve 32926)*. Unpublished report for the Department of Planning and Urban Development, Perth, Western Australia.
- Keighery GJ** 1992b *Jandakot Botanical Park Report 2: Vegetation and Flora of the Dennis De Young Reserve (No. 31653 and No. 33002), Bartram Road Complex (No. 418, Loc. 206 and 209), and Swamp Complex and Reserve 418, Jandakot*. Unpublished report for the Department of Planning and Urban Development, Perth, Western Australia.
- Keighery GJ** 1992c *Jandakot Botanical Park Report 3: Vegetation and Flora of Wandii Nature Reserve (C36110) and Lot 30 Anketell Road*. Unpublished report for the Department of Planning and Urban Development, Perth, Western Australia.
- Keighery GJ** 1993a *Species list for Brixton Street Wetlands and Yule Brook Reserve*. An unpublished list for the Department of Conservation and Land Management, Perth, Western Australia. IN: Gray M 1993 *Evaluation of the National Estate value of remnant bushland on the Swan Coastal Plain between Moore River and Mandurah. Brixton Street Wetlands and adjacent bushland including System 6 areas M69*. Unpublished report to the Wildflower Society of WA (Inc.) for the Australian Heritage Commission, Canberra, Australian Capital Territory.
- Keighery GJ** 1993b *Flora list for Yanchep National Park and adjacent proposed additions in Ridges State Forest and part State Forest 65 (after Yanchep National Park Management Plan, CALM 1989)*. Unpublished list prepared for the Department of Conservation and Land Management, Perth, Western Australia.
- Keighery GJ** 1994 *Jandakot Botanical Park Report 4: Lot 40 Forrest Road, Jandakot*. Unpublished report for the Department of Planning and Urban Development, Perth, Western Australia.
- Keighery GJ** 1996 *Progress Report: Conservation Status of Vascular Flora of the Southern Swan Coastal Plain*. Unpublished Report to the Australian Nature Conservation Agency, Canberra, Australian Capital Territory.
- Keighery GJ** 1998 *Weeds of Garden Island — An Annotated List*. *Western Australian Naturalist* 22: 61–76.
- Keighery GJ, Gibson N and Keighery BJ** 1995 *Flora conservation values of Mundijong Road*. Unpublished report to the Department of Conservation and Land Management for the Ministry for Planning, Perth, Western Australia.
- Keighery GJ, Harvey J and Keighery BJ** 1990 *Vegetation and Flora of Bold Park, Perth*. *Western Australian Naturalist* 18: 100–22.
- Keighery GJ and Keighery BJ** 1991 Part II: *Brixton Street Wetlands, Kenwick*. IN: Keighery GJ and Keighery BJ 1991 *Floristics of Reserves and Bushland Areas of the Perth Region (System 6). Parts II-IV*. Wildflower Society of Western Australia (Inc.), Nedlands, Western Australia.
- Keighery GJ and Keighery BJ** 1992a *Flora of the Burns Beach Coastal Reserve*. Unpublished report for the Department of Conservation and Land Management, Como, Western Australia.
- Keighery GJ and Keighery BJ** 1992b *Plant Communities of the Northern Swan Coastal Plain — with special reference to uncommon and potentially Rare Plant Communities*. IN: Gibson N and Keighery BJ (Eds) *Bushland in Our Backyard*. Proceedings of a workshop in June, 1992, held by the Wildflower Society of Western Australia (Inc.), Nedlands, Western Australia.
- Keighery GJ and Keighery BJ** 1993a Parts V-VII: *Floristics of Three Bushland Areas of the Eastern Side of the Swan Coastal Plain (Part V Floristics of Talbot Road Bushland, Part VI Floristics of Brickwood Bushland and Part VII Floristics of Cardup Nature Reserve)*. IN: Keighery GJ and Keighery BJ

- 1993 *Floristics of Reserves and Bushland Areas of the Perth Region (System 6). Parts V-IX*. Wildflower Society of WA (Inc.), Nedlands, Western Australia.
- Keighery GJ and Keighery BJ** 1993b Part VIII: Floristics of Wandii Nature Reserve. IN: Keighery GJ and Keighery BJ 1993 *Floristics of Reserves and Bushland Areas of the Perth Region (System 6). Parts V-IX*. Wildflower Society of WA (Inc.), Nedlands, Western Australia.
- Keighery GJ and Keighery BJ** 1993c Part IX: The Flora of Three Coastal Bushland Areas (System 6 Areas M46, M91 and M106). IN: Keighery GJ and Keighery BJ 1993 *Floristics of Reserves and Bushland Areas of the Perth Region (System 6). Parts V-IX*. Wildflower Society of WA (Inc.), Nedlands, Western Australia.
- Keighery GJ and Keighery BJ** 1995 *Muchea Limestones — Floristics*. Unpublished report to the Australian Nature Conservation Agency National Reserves Network and the Department of Conservation and Land Management, Como, Western Australia.
- Keighery GJ and Keighery BJ** 1996 *Vegetation and Flora of Lambkin Reserve, Serpentine (Reserve 32352)*. Unpublished report for the Department of Conservation and Land Management, Como, Western Australia.
- Keighery GJ and Keighery BJ and Gibson N** 1997 Part XII: Floristics of the Bullsbrook Nature Reserve (M14). IN: *Floristics of Reserves and Bushland Areas of the Perth Region (System 6). Parts XI-XV*. Wildflower Society of Western Australia (Inc.), Nedlands, Western Australia.
- Keighery GJ and Keighery BJ** 1998 *Floristics of System Six Reserves and Bushland. Part XVI: Point Heathcote Foreshore (M65), Minim Cove (M 57), Mosman Park (M56), Peppermint Grove Foreshore (M 54) and Point Resolution (M59)*. Unpublished report for the Departments of Conservation and Land Management and Environmental Protection, Perth, Western Australia.
- Keighery GJ and Langley M** 1994 *Flora of the Woodvale Nature Reserve*. Unpublished report for the Department of Conservation and Land Management, Perth, Western Australia.
- Kelly A, Taylor A, Langley MA, Spooner A and Coates DJ** 1993 *Declared Rare Flora and Other Plants in Need of Special Protection in the Metropolitan Region. Wildlife Management Program 10*. Department of Conservation and Land Management, Como, Western Australia.
- Kings Park and Botanic Garden** 1995 *Kings Park Bushland Management Plan 1995-2005*. West Perth, Western Australia.
- Kinhill Stearns** 1983 *Proposed Refuse Disposal Facility at Mindarie. Environmental Review and Management Program*. IN: Scott and Furphy Engineers Pty Ltd and LeProvost, Semeniuk & Chalmer 1985 *Environmental Review and Management Plan for Mindarie Keys Project*. Prepared for the Smith Corporation Pty Ltd.
- Kinhill Engineers Pty Ltd** 1987 *Residential Subdivision of Lot 1 Stephenson Ave. Public Environmental Review*. Prepared for Bond Corporation Holdings Limited.
- Kinhill Engineers Pty Ltd** 1988 *Peel Inlet and Harvey Estuary Management Strategy, Environmental Review and Management Programme — Stage 2*. Report to the Departments of Agriculture and Marine and Harbours, Perth, Western Australia.
- Kitchener DJ, Chapman A, Dell J, Muir BG and Palmer M** 1980 Lizard assemblages and reserve size and structure in the Western Australian wheatbelt — some implications for conservation. *Biological Conservation* 17: 25-62.
- Kitchener DJ, Chapman A, Muir BG and Palmer M** 1980 The conservation value for mammals of reserves in the Western Australian wheatbelt. *Biological Conservation* 18: 179-207.
- Kitchener DJ, Dell J, Muir BG and Palmer M** 1982 Birds in Australian Wheatbelt reserves — implications for conservation. *Biological Conservation* 22: 127-63.

- Knott B and Jasinska EJ** 1996 *Wetlands Survey*. Unpublished survey for the Water and Rivers Commission of Western Australia, East Perth, Western Australia.
- Kuchling G and Burbidge AA** 1996 *Survey of the Western Swamp Tortoise and its Habitat at the Perth Airport*. Unpublished report for the Australian Heritage Commission.
- Landsdale Farm School** 1995 *A preliminary list of plants found in the Landsdale Road Conservation Park*. Unpublished report.
- Lane J, Janesch R and Lynch R** 1996 *Western Australia*. IN: Australian Nature Conservation Agency *A Directory of Important Wetlands in Australia (Second Edition)*. ANCA, Canberra, Australian Capital Territory.
- Lantzke IR, Gabriel PW and Haynes BT** 1989 *Lake Claremont Research Report (1987-88)*. Unpublished report for the City of Claremont by the Western Australian College of Advanced Education, Western Australia.
- Le Provost Environmental Consultants** 1990 *Eglinton Beach Resort Public Environmental Review, Volumes 1 and 2*. Unpublished report prepared for Eglinton Resort Development Pty Ltd.
- LeProvost, Semeniuk & Chalmers** 1984 *Terrestrial Habitats, Soils and Vegetation of the Quinns Rocks Area*. Appendix 5 IN: Scott and Furphy Engineers Pty Ltd and LeProvost, Semeniuk and Chalmers 1985 *Environmental Review and Management Plan for Mindarie Keys Project Volume II - Technical Appendices*. Prepared for the Smith Corporation Pty Ltd.
- Le Provost, Semeniuk & Chalmers** 1985 *An environmental assessment of stormwater disposal in the Piney Lakes Reserve*. Prepared for The University of Western Australia, Nedlands, Western Australia.
- Le Provost, Semeniuk & Chalmers** 1987 *Assessment of wetlands along the proposed Roe Highway*. Unpublished report (No. R22) for the Department of Conservation and Environment, Perth, Western Australia.
- Le Provost, Semeniuk & Chalmers** 1988 *Trigg Regional Open Space Management Plan*. Prepared for the City of Stirling, Western Australia.
- Lemmon TC, Gee RD, Morgan WR and Elkington CR** 1979 *Important Geological Sites in the Perth and Southwestern Area of Western Australia — A report on their scientific significance and future protection*. Geological Society of Australia Inc., Western Australia Division.
- Loneragan WA, McMillan RP, Townley LR and Watson LE** 1984 *Star Swamp Bushland Reserve: proposals for development and management*. Report to the Australian Heritage Commission prepared by the Botany Department, The University of Western Australia, Nedlands, Western Australia.
- Loneragan WA (Convenor)** 1987 *Star Swamp Bushland Reserve Management Plan*. Prepared for the City of Stirling, Western Australia.
- Main AR and Serventy DL** 1957 *Kings Park as an indigenous park — a natural history appraisal*. *Western Australian Naturalist* 6: 25-53.
- Main BY** 1990 *Restoration of biological scenarios: the role of museum collections*. *Proceedings of the Ecological Society of Australia* 16: 397-409.
- Main Roads** 1993 *Public Environmental Review Roe Highway Extension Welshpool Road to South Street*. Main Roads, Perth, Western Australia.
- Marchant NG and Abbot I** 1981 *Historical and recent Observations of the Flora of Garden Island, Western Australia*. *Western Australian Herbarium Research Notes* 5.
- Marchant NG, Wheeler JR, Rye BL, Bennett EM, Lander NS and Macfarlane TD** 1987 *Flora of the Perth Region: Parts One and Two*. Western Australian Herbarium, Department of Agriculture, Perth, Western Australia.
- Markey A** 1997 *A Floristic Survey of the Northern Darling Scarp*. Unpublished report to the Western Australian



- Department of Conservation and Land Management, the Western Australian Department of Environmental Protection and the Conservation Council of Western Australia (Inc.) for the Australian Heritage Commission, Canberra, Australian Capital Territory.
- Martinick & Associates Pty Ltd** 1989 *Jandakot Airport Environmental Appraisal*. Unpublished Report for the Federal Airports Corporation, Belmont, Western Australia.
- Masters, BK & Associates Pty Ltd** 1992 *Wetland Survey for Waterbird Conservation Values*. Unpublished report for Pittison Mineral Sands of WA Pty Ltd, Hopelands Mineral Sand Project.
- Mattiske, EM & Associates** 1987 *Ecological Studies — Kings Park*. Unpublished report for the State Planning Commission, Perth, Western Australia.
- Mattiske, EM & Associates** 1989 *Ecological Studies — Whiteman Park*. Unpublished report for the Kings Park Board, West Perth, Western Australia.
- Mattiske, EM & Associates** 1992 *Flora and Vegetation — Boundary and Brook Roads, Kenwick*. Unpublished report for the Department of Urban Development, Perth, Western Australia.
- Mattiske Consulting Pty Ltd** 1997 *Assessment of Bushland Patches in the Perth Metropolitan Area*. Unpublished report for the Ministry for Planning, Perth, Western Australia.
- Maunsell & Partners Pty Ltd** 1978 *Whiteman Park*. Unpublished report prepared for the Metropolitan Regional Planning Authority, Perth, Western Australia.
- Mawson PR and Massam MC** 1995 The Birds of a Remnant of Native Vegetation on the Eastern Swan Coastal Plain *Western Australian Naturalist* 20: 37-47.
- McArthur WM** 1957 Plant Ecology of the coastal islands near Fremantle, WA. *Journal of the Royal Society of Western Australia*, Volume 40.
- McArthur WM** 1990 *The Vegetation Communities and some Aspects of Landscape Management on Garden Island, Western Australia*. Unpublished report for the Garden Island Environmental Advisory Group.
- McArthur WM and Bartle GA** 1980 *Landforms and Soils as an Aid to Urban Planning in the Perth Metropolitan Northwest Corridor, Western Australia. Maps 1-4*. CSIRO Land Resources Management Series No. 5.
- McArthur WM and Bartle GA** 1981 *The Landforms, Soils and Vegetation as a Basis for Management Studies on Garden Island, Western Australia*. CSIRO Land Resources Management Series No. 7.
- McArthur WM and Bettenay E** 1960 *The development and distribution of soils on the Swan Coastal Plain, Western Australia*. CSIRO Soil Publication No. 16.
- McArthur WM and Mattiske EM** 1985 *The Gnangara Mound Groundwater Area: Landforms, Soils and Vegetation*. IN: Dames and Moore 1986 *Gnangara Mound Groundwater Resources Environmental Review and Management Programme (Appendices)*. A report for the Water Authority of Western Australia, Leederville, Western Australia.
- McComb JA and McComb AJ** 1967 A preliminary account of the vegetation of Loch McNess, a swamp and fen formation in Western Australia. *Journal of the Royal Society of Western Australia* 50: 105-122.
- Meney K** 1987 *Draft Management Plan Maylands Foreshore Reserve (East Street to Fogerthorpe Crescent)*. Unpublished report for the City of Stirling, Western Australia.
- Meney K** 1989 *Management Plan Maylands Foreshore Reserve (Beringa Park)*. Unpublished report for the City of Stirling, Western Australia.
- Meney K** 1991 *Management Plan Trigg Bushland Reserve (Trigg Regional Open Space)*. Unpublished report for the City of Stirling, Western Australia.

- Menev K** 1996 *Flora Survey and Conservation Assessment of Reserve 1820 Jandakot* Unpublished report for the City of Cockburn, Western Australia.
- MfP** 1993 *Proposals for the Darling Range Regional Park*. Published for Western Australian Planning Commission, Perth, Western Australia.
- MfP** 1995 *Proposals for the Jandakot Botanic Park Final*. Published for Western Australian Planning Commission, Perth, Western Australia.
- Mitchell McCotter and Ecoscape** 1993 *Bold Park and Environs Public Environmental Review*. Prepared for the City of Perth, Western Australia.
- Moore LS** 1993 *The Modern Thrombolites of Lake Clifton, Southwestern Australia*. Unpublished PhD Thesis, The University of Western Australia, Nedlands, Western Australia.
- Muir BG** 1977 Biological Survey of the Western Australian Wheatbelt. Part II: Vegetation and habitat of Bending Reserve. *Records of the Western Australian Museum*, Supplement No. 3.
- Muir BG** 1983 Drainage, swamp structure and vegetation succession at Melaleuca Park, Northern Swan Coastal Plain. *Western Australian Herbarium Research Notes* 9:27-39.
- Murdoch University** 1988 *Draft Management Proposal for Yangebup Lake*. Students of N319 Environmental Management, Murdoch University, Murdoch, Western Australia.
- Murdoch University** 1994 *Management Proposal for Wetlands in the City of Cockburn*. Students of N319 Environmental Management, Environmental Science, Murdoch University, Murdoch, Western Australia.
- Murdoch University** 1996 *Management Proposal for Lightning Swamp in the Shire of Swan*. Students of N319 Environmental Management, Murdoch University, Murdoch, Western Australia.
- National Trust of Australia (WA)** 1993 *Urban Bushland Policy*. National Trust of Australia (WA), Wildflower Society of Western Australia (Inc.) and The Tree Society (Inc.), Perth, Western Australia.
- Ninox Wildlife Consulting** 1991 *The Wilbinga and Breton Bay Sites, A Comparative Appraisal of their Vertebrate Fauna*. Prepared for Halpern Glick Maunsell, Perth, Western Australia.
- Orr K** 1986 *The Salter Point Foreshore Management Plan*. City of South Perth, Western Australia.
- Orr K** 1987 *The Waterford Foreshore Management Plan*. City of South Perth, Western Australia.
- Pawluk, Richard and Associates** 1995 *Flynn Drive industrial area district structure plan*, prepared for City of Wanneroo, Landcorp, Borrello, Cockburn cement, Trandos and Susac.
- Payne J** 1993a *Wetlands in the City of Armadale*. Report to the Water Authority of Western Australia, Leederville, and the Environmental Protection Authority, Perth, Western Australia.
- Payne J** 1993b *Wetlands in the City of Gosnells*. Report to the Water Authority of Western Australia, Leederville, and the Environmental Protection Authority, Perth, Western Australia.
- Peel-Harvey Study Group** 1985 *Peel Inlet and Harvey Estuary Management Strategy, Environmental Review and Management Programme, Stage 1*. Report to the Department of Conservation and Land Management, Como, Western Australia.
- Pen LJ** 1983 *Peripheral Vegetation of the Swan and Canning Estuaries 1981*. Bulletin 113. Department of Conservation and Environment and the Swan River Management Authority, Western Australia.
- Pen LJ** 1993 *Fringing vegetation of the Canning, Southern and Wungong Rivers*. Report No. 7. Swan River Trust, Perth, Western Australia.

- Pigott P** 1994 *Studies into Anthropogenic Disturbance and Fire Regimes on the Vegetation of Star Swamp Bushland Reserve*. Thesis for MSc degree, Department of Botany, The University of Western Australia, Nedlands, Western Australia.
- Playford PE, Cockbain AE and Low GH** 1976 Geology of the Perth Basin Western Australia. *Geological Survey of Western Australia Bulletin 124*: 1-310.
- Powell R and Emberson J** 1981 *Woodman Point. A Relic of Perth's Coastal Vegetation*. Artlook, Western Australia.
- RAMSAR** - refer to Environment Australia 1998 D; also UNESCO.
- Recher HF and Serventy L** 1991 Long term changes in the relative abundances of birds in Kings Park, Perth, Western Australia. *Conservation Biology* 5: 90-102.
- Regeneration Technology Pty Ltd** 1994 *Baigup Management Plan 1994 - 1999*. Report prepared for the City of Bayswater and the City of Stirling.
- Robinson D, Maryan B and Browne-Cooper R** 1987 Herpetofauna of Garden Island. *Western Australian Naturalist* 17: 11-16.
- Robinson N** 1995 *A Survey of the Flora and Vegetation of Coastal Reserves North of Quinns Rocks, Western Australia*. Unpublished report (Project SCI 3451) for Environmental Management, Edith Cowan University, Churchlands, Western Australia.
- Robinson MH and Mawson PR** 1993 The flora of a remnant of native vegetation on the eastern Swan Coastal Plain. *Western Australian Naturalist* 19: 162-73.
- Robson B and Charter E** 1989 *Report on the Aquatic Fauna of Munday Swamp as an Indicator of Environmental Quality*. Unpublished report for the Biological Sciences Department, Murdoch University, Murdoch, Western Australia.
- Rodda J** 1986 *Piney Lake Reserve. An ecological study with guidelines for management*. Wetlands Conservation Society, Perth, Western Australia.
- Sarti N and Allen GR** 1978 Freshwater Fishes. IN: How RA (Ed.) 1978 *Faunal studies of the Northern Swan Coastal Plain: A consideration of Past and Future Changes Western Australian Museum*. Unpublished report for the Department of Conservation and Environment, Perth, Western Australia.
- Searle DJ, Semeniuk V and Woods PJ** 1988 Geomorphology, stratigraphy and Holocene history of the Rockingham-Becher Plain, South-western Australia. *Journal of the Royal Society of WA* 70(4):89-109.
- Seddon G** 1972 *A Sense of Place*. University of Western Australia Press, Nedlands, Western Australia.
- Semeniuk CA** 1987 Wetlands of the Darling System — consanguineous wetlands and their distribution in the Darling System, South Western Australia. *Journal of the Royal Society of Western Australia* 70:69-87.
- Semeniuk CA** 1996 Natural Wetland groups in the Perth to Bunbury Region. IN: Hill et al. 1996a *Wetlands of the Swan Coastal Plain. Volume 1: Wetland mapping, classification and evaluation, Main Report*. Prepared for the Water and Rivers Commission and the Department of Environmental Protection, Perth, Western Australia.
- Semeniuk CA and Semeniuk V** 1996a The geomorphic classification of wetlands. IN: Hill et al. 1996a *Wetlands of the Swan Coastal Plain. Volume 1: Wetland Mapping, Classification and Evaluation, Main Report*. Prepared for the Water and Rivers Commission and the Department of Environmental Protection, Perth, Western Australia.



- Semeniuk CA and Semeniuk V** 1996b
 Geomorphic wetland mapping and classification in the Perth to Bunbury region. IN: Hill et al. 1996a *Wetlands of the Swan Coastal Plain. Volume 1: Wetland Mapping, Classification and Evaluation, Main Report*. Prepared for the Water and Rivers Commission and the Department of Environmental Protection, Perth, Western Australia.
- Semeniuk V and Glassford DK** 1989
 Bassendean and Spearwood Dunes: their geomorphology, stratigraphy and soils as a basis for habitats of *Banksia* Woodlands. *Journal of the Royal Society of Western Australia* 71:87-88.
- Semeniuk V, Creswell ID and Wurn PAS** 1989
 The Quindalup Dunes: the regional system, physical framework and vegetation habitats. *Journal of the Royal Society of Western Australia* 71(2&3): 23-47.
- Semeniuk, V&C Research Group** 1991a
Environmental and Landscape Audit of the Southwest, Northwest, and Northeast Corridors Perth Metropolitan Area. Stage 1 Interim Report: The Northwest Corridor Study. Unpublished report for the Department of Planning and Urban Development (available for viewing at the Ministry for Planning Library), Perth, Western Australia.
- Semeniuk, V&C Research Group** 1991b
Environmental and Landscape Audit of the Southwest, Northwest, and Northeast Corridors Perth Metropolitan Area. Stage 2 Interim Report: The Southwest Corridor Study. Unpublished report for the Department of Planning and Urban Development (available for viewing at the Ministry for Planning Library), Perth, Western Australia.
- Semeniuk, V&C Research Group** 1991c
Environmental and Landscape Audit of the Southwest, Northwest, and Northeast Corridors Perth Metropolitan Area. Stage 3 Interim Report: The Foothills Corridor Study. Unpublished report for the Department of Planning and Urban Development (available for viewing at the Ministry for Planning Library), Perth, Western Australia.
- Semeniuk, V&C Research Group** 1991d
Environmental/Ecological Assessment of wetlands and upland of Paganoni area. Unpublished report to the Department of Planning and Urban Development, Perth, Western Australia.
- Semeniuk, V&C Research Group** 1991e
Wetlands of the City of Rockingham, their classification, significance and management. Unpublished report for the National Estates Grants Program.
- Semeniuk, V&C Research Group** 1992
Environmental and Landscape Audit of the Southwest, Northeast, and Northeast Corridors Perth Metropolitan Area. Stage 4 Interim Report: The Northeast Corridor Study. Unpublished report for the Department of Planning and Urban Development (available for viewing at the Ministry for Planning Library), Perth, Western Australia.
- Semeniuk, V&C Research Group** 1993
Environmental and Landscape Audit of the Southwest, Northeast, and Northeast Corridors Perth Metropolitan Area. Stage 5 Interim Report: The Southeast Corridor Study. Unpublished report for the Department of Planning and Urban Development (available for viewing at the Ministry for Planning Library), Perth, Western Australia.
- Semeniuk, V&C Research Group** 1997a
Verification of the Conservation Category Wetlands in the Perth Metropolitan Area. Unpublished report to the Water and Rivers Commission, Perth, Western Australia.
- Semeniuk, V&C Research Group** 1997b
Natural Reserves Management Study. Unpublished report for the Environmental Division, City of Cockburn, Western Australia.
- Shire of Kalamunda** 1996 *Hartfield Park Management Plan*. Shire of Kalamunda, Western Australia.
- Shire of Serpentine-Jarrahdale** 1992
Assessment of the Conservation Values of Roadside Vegetation in the Shire of Serpentine-Jarrahdale. Unpublished report, Shire of Serpentine-Jarrahdale, Western Australia.



- Simon N** 1991 *The Garratt Road Wetland: A site assessment and recommendations for future management*. Unpublished report, The University of Western Australia, Nedlands, Western Australia.
- Simon N, Davis G, Hubbard, P and Duckworth A** 1993 *Fringing Vegetation of the Serpentine River in the Shire of Serpentine-Jarrahdale and City of Rockingham*. Report (No. 38) to the Peel Inlet Management Authority. Waterways Commission, Perth, Western Australia.
- Smith P** 1985 *Bayswater Swan River Foreshore Study, An Environmental Appraisal of Planning Problems within Bayswater's Swan River Foreshore Area*. Prepared for the City of Bayswater, Western Australia.
- Smith P** 1987 *Bull Creek Park Management Plan*. Prepared for the City of Melville, Western Australia.
- Smith V** 1985a *Booragoon Lake Draft Management Plan*. Prepared for the City of Melville, Western Australia.
- Smith V** 1985b *Wireless Hill Park Management Plan*. Prepared for the City of Melville, Western Australia.
- Smith V** 1986 *Blackwall Reach Reserve — Draft Management Plan*. Prepared for the City of Melville, Western Australia.
- Smith V and Smith P** 1986 *Blackwall Reach Reserve Management Plan*. Prepared for the City of Melville, Western Australia.
- Smurthwaite AJ** 1986a *Mundaring Sheet part Sheet 2133 II and 2134 III, Environmental Geology Series*. Geological Survey of Western Australia, Department of Minerals and Energy, Perth, Western Australia.
- Smurthwaite AJ** 1986b *Gleneagle Sheet part Sheet 2134 II and 2133 III, Environmental Geology Series*. Geological Survey of Western Australia, Department of Minerals and Energy, Perth, Western Australia.
- Speck NH and Baird AM** 1984 *Vegetation of Yule Brook Reserve near Perth, Western Australia*. *Journal of the Royal Society of Western Australia* 66(4): 147-62.
- Speck NH** 1952 *The Ecology of the Metropolitan Sector of the Swan Coastal Plain*. Masters of Science Thesis, The University of Western Australia, Nedlands, Western Australia.
- State Planning Commission** 1989 *Canning River Regional Park*. State Planning Commission, Perth, Western Australia.
- Storey AW, Vervest RM, Pearson GB and Halse SA** 1993 *Wetlands of the Swan Coastal Plain, Volume 7: An assessment of the different types of wetlands for waterbirds*. Prepared for the Water Authority of Western Australia and the Department of Environmental Protection, Perth, Western Australia.
- Storr GM and Johnstone RE** 1988 *Birds of the Swan Coastal Plain*. *Records of the Western Australian Museum Supplement* 28.
- Storr GM** 1961 *The Flora of the Shoalwater Bay Islands*. *Western Australian Naturalist* 2: 43-51.
- Street M** 1992 *Blue Gum Lake Reserve Management Plan*. Prepared for the City of Melville, Western Australia.
- Swan River Trust** 1994 *Draft Lower Canning River Management Plan, Report No. 15*. Swan River Trust, Perth, Western Australia.
- Tauss C** 1997 *Flora of Queens Park Ecological Area*. Unpublished report for the City of Canning, Western Australia.
- Tingay A and SR** 1977 *The Lakes Regional Open Space — Biological Survey for the Shire of Rockingham*, Shire of Rockingham, Western Australia.
- Tingay A and SR** 1990 *Environmental Protection Authority Structure Plan for Reserve C29880 Forrestfield (System 6 Area M53)*. Unpublished report for the Environmental Protection Authority, Perth, Western Australia.

- Tingay, Alan & Associates** 1991a *An Assessment of the Flora and Vegetation of Hepburn Heights*. Unpublished report for Landcorp, Joondalup, Western Australia.
- Tingay, Alan & Associates** 1991b *Yanchep Structure Plan. Vertebrate Fauna Survey. Response to Draft North-West Corridor Structure Plan. Department of Planning and Urban Development*. Prepared for Tokyu Corporation.
- Tingay, Alan & Associates** 1991c *Yanchep Structure Plan. Flora and Vegetation Report Survey. Response to Draft North-West Corridor Structure Plan. Department of Planning and Urban Development*. Prepared for Tokyu Corporation.
- Tingay, Alan & Associates** 1992 *Yanchep Structure Plan. System 6 Areas M1 and M3 Discussion Paper. Response to Draft North-West Corridor Structure Plan. Department of Planning and Urban Development*. Prepared for Tokyu Corporation.
- Tingay, Alan & Associates** 1994a *Egerton Structure Plan Consultative Environmental Review. Report 93/61 prepared for Multiplex Construction Pty Ltd*.
- Tingay, Alan & Associates** 1994b *Invertebrate and vertebrate fauna at Perth Airport*. Unpublished report 93/78 for the Federal Airports Corporation, Belmont, Western Australia.
- Tingay, Alan & Associates** 1994c *Flora and Vegetation of the Perth Airport*. Unpublished report for the Federal Airports Corporation, Belmont, Western Australia.
- Tingay, Alan & Associates** 1994d *Egerton Fauna Survey. Technical Report: Supplement to Consultative Environmental Review. Report 93/74 prepared for Multiplex Constructions Pty Ltd*.
- Tingay, Alan & Associates** 1997a *A Strategic Plan for Perth's Greenways - Draft*. Prepared for Environment Australia, Ministry for Planning, Department of Conservation and Land Management, Western Australia Municipal Association, Department of Environmental Protection, Water and Rivers Commission, Main Roads WA, Swan Catchment Centre, Conservation Council, Greening WA and Australian Trust for Conservation Volunteers.
- Tingay, Alan & Associates** 1997b *Proposed Port Kennedy and Rockingham Parks Management Framework*. Prepared for the City of Rockingham, the Western Australian Planning Commission, the Department of Conservation and Land Management and the Port Kennedy Board of Management.
- Tingay, Alan & Associates** 1998 *Shire of Serpentine-Jarrahdale, Town Planning Scheme 2, Amendment 77, Pt Lots 521 and 523 South Western Highway, Byford, Environmental Review, March 1998, Report 97/50*
- Trudgen ME** 1988 *A Report on the Flora and Vegetation of the Port Kennedy Area*. Unpublished report for Bowman, Bishaw and Associates, Subiaco, Western Australia.
- Trudgen ME** 1989 *Vegetation Survey of the Point Becher Area. Appendix D. IN: Binney & Partners Pty Ltd Volume III Port Kennedy Regional Recreation Centre Environmental Review and Management Programme*. Prepared for Port Kennedy Joint Venture.
- Trudgen ME** 1990 *An Assessment of the Vegetation and Flora Conservation Values in the area between Jandakot and Wellard*. Unpublished report for Bowman Bishaw Gorham, Subiaco, Western Australia.
- Trudgen ME** 1991 *Vegetation Condition Scale. IN: National Trust (WA) 1993 Urban Bushland Policy. National Trust of Australia (WA), Wildflower Society of Western Australia (Inc.) and The Tree Society (Inc.), Perth, Western Australia*.
- Trudgen ME** 1993a *East Wanneroo Natural Resources Mapping Study — Flora and Vegetation*. Unpublished report for Bowman Bishaw Gorham, Subiaco, Western Australia.
- Trudgen ME** 1993b *A Report on the Flora and Vegetation of the Port Kennedy Area*. Unpublished report for Bowman, Bishaw and Associates, Subiaco, Western Australia.

Trudgen ME 1995a *Objection Assessment for the Perth Airport, flora values and advice on the flora values of bushland not currently listed.* Unpublished report for the Australian Heritage Commission.

Trudgen ME 1995b *A Flora and Vegetation Survey of Lots 1534 and 1792 Wirrega Road, Jandabup.* Unpublished report for the Ministry for Planning, Perth, Western Australia.

Trudgen ME 1996 *An assessment of the conservation values of the remnant vegetation in the City of Wanneroo with recommendations for appropriate reserves for the City.* Unpublished report for the City of Wanneroo, Western Australia.

Trudgen ME, Griffin EA and Keighery BJ 1990 *A Report on the Flora and Vegetation of areas at Wilbinga and Breton Bay proposed as alternatives for a future industrial site.* Unpublished report for Halpern, Glick and Maunsell.

Trudgen ME and Keighery BJ 1990a *A Report on the Flora and Vegetation of the Alkimos area and Conservation Issues affecting it.* Unpublished report for Landcorp, Joondalup, Western Australia.

Trudgen ME and Keighery BJ 1990b *A Report on the Flora and Vegetation of the Ningana area and Conservation Issues affecting it.* Unpublished report for Landcorp, Joondalup, Western Australia.

Trudgen ME and Keighery BJ 1995 *A Survey of the Remnant Vegetation of the City of Gosnells west of the Darling Scarp.* Unpublished report prepared for the City of Gosnells, Western Australia.

Turpin MC 1990 *Ecological Appraisal of an Isolated Banksia Woodland Reserve No. 3694 South of the Swan River, Perth, Western Australia.* *Western Australian Naturalist* 18: 131-38.

Turpin MC 1991 *Additions to the Fauna of Reserve No. 3694, Victoria Park, Western Australia* *Western Australian Naturalist* 18: 168

UNEP - refer to United Nations Environment Program.

UNESCO 1971 *Article 1, part 1, Convention on Wetlands of International Importance especially as Waterfowl Habitat.* Published in Australia, 1976, for the Department of Foreign Affairs, Australian Government Publishing Service, Treaty Series 1975, No. 48.

United Nations Environment and Science Conservation Organisation - refer to UNESCO.

V&C Semeniuk Research Group - refer to Semeniuk, V&C Research Group.

Van Gool D 1994 *Preliminary Vegetation and Land Use Mapping in the Peel-Harvey Catchment Area.* Peel-Harvey Catchment Support Group and Department of Agriculture, Perth, Western Australia.

Wake D 1995 *Natural Environment Nomination for the Register of the National Estate. Koondoola Open Space.* Unpublished report for the National Trust of Australia (WA).

Water Authority of Western Australia - refer to WAWA.

Watkins DJ, Bamford MJ and Bamford AR 1993 *Ellenbrook Fauna: Report on Fauna Conservation Values of the Northern Section of the Ellenbrook Project.* Unpublished report for Bowman Bishaw Gorham, Perth, Western Australia.

Watson LE and Bell DT 1981 *The ecology of Star Swamp and surrounding bushlands, North Beach, Western Australia.* *Journal of the Royal Society of Western Australia* 63: 103-17.

WAWA 1995 *Review of proposed changes to environmental conditions. Gngara Mound Groundwater Resources (Section 46).* Water Authority of Western Australia, Perth, Western Australia.

Wellington BD and Dell J 1989 *Reptiles and amphibians of the Darling Scarp near Perth.* *Western Australian Naturalist* 17: 226-28.

- Weston A and Clay BT** 1980 *Vascular Plants of the University of Western Australia Marsupial Breeding Station*. Unpublished List.
- Weston AS** 1989a *Vegetation and Significant Flora in Lots 65 and 66 Anstey/Keane Roads, Forrestdale, City of Armadale*. Unpublished report for GR Crimp and Partners, West Perth, Western Australia.
- Weston AS** 1989b *Vegetation and Significant Flora in Lots 106 and 107 Nicholson road, Oakford, Shire of Serpentine-Jarrahdale*. Unpublished report for GR Crimp and Partners, West Perth, Western Australia.
- Weston AS** 1990 *Vegetation and Significant Flora in Lots 68 and 70 Anstey Roads, Forrestdale, City of Armadale*. Unpublished report for the Industrial Lands Development Authority, Perth, Western Australia.
- Weston AS** 1993 *Beeliar Wetlands Area Condition Assessment. Assessment of condition of non-wetland areas in the proposed Beeliar Wetlands National Estate area*. Unpublished report for the Australian Heritage Commission, Canberra, Australian Capital Territory.
- Weston AS** 1998 *Rare Flora Search — 83 Bedford Crescent (Pts Lots 32, 20) Forrestfield*. Unpublished Report for Frank Jasper Pty Ltd and Ray White Commercial.
- Weston AS and Gibson N** 1997 *Report on the limestone vegetation of the Wabbling Hill area, Reserves 3911 and 39412, and the Ridges extension to Yanchep National Park*. Unpublished report for the Department of Conservation and Land Management, Como, Western Australia.
- Weston AS, Griffin EA and Trudgen M** 1993 *Flora and Vegetation Conservation Values of the Ellenbrook Estate*. WITH: Bowman Bishaw Gorham 1993.
- Wetland Advisory Committee** 1977 *The Status of Wetland Reserves in System Six*. Report of the Wetlands Advisory Committee to the Environmental Protection Authority, Perth, Western Australia.
- White R** (undated) *Thomsons Lake Nature Reserve*. Unpublished.
- Wildflower Society of WA (Inc), Murdoch Branch** 1992 *Flora and vegetation of Ken Hurst Park*. Unpublished report to the City of Melville, Western Australia.
- Williams M, Williams A, Lundstrom T, Hutchinson P, Hay B and Bollam H** 1996 'System 6 update: Potential Invertebrate Sites.' From members of the WA Insect Study Society.
- Wood & Grieve** 1994 *Canning Property Group Residential Subdivision, Acourt Road, Canning Vale, Consultative Environmental Review*.
- Woods PJ** 1979 *An explanation of the dune features of the Swan Coastal Plain*. Paper presented to Coastal Management Seminar, Bunbury, December 6-7, 1979. Department of Conservation and Environment, Perth, Western Australia.



Part B

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